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THE POLYPORACEÆ OF OHIO

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INTRODUCTION

The *Polyporaceæ*, or "pore fungi," constitute a relatively small family of the *Basidiomycetes*, characterized by having the spores borne on the interior surfaces of tubes or pores which make up the hymenium of the fungus. In its most comprehensive sense the family embraces the two subfamilies *Boleteæ* and *Polyporeæ*, including also such aberrant genera as *Merulius*, *Porothelium*, *Solenia*, etc. More often the *Boleteæ* are made a separate family, the *Boletaceæ*, usually distinguished from the true *Polyporaceæ* by the more fleshy nature of the plant and by the fact that the pores rather easily separate in a smooth layer from the flesh of the pileus. The true *Polyporaceæ*, on the other hand are more commonly leathery, corky, or woody in texture, and only in rare cases are the tubes separable from the context. More recently Dr. Murrill, who has monographed the North American species of the family for the North American Flora—now being issued by the New York Botanical Garden—, has still further limited the family so as to exclude not only the genera referred to above, but also certain of the true polypores which possess a more or less gelatinous or waxy hymenium. For the reception of certain of these forms he has erected the family *Xylophagaceæ*.

C. G. Lloyd has published monographic papers on certain of the sections of the family, using for the most part as the generic names, the sectional names given by Fries. Within the past year a third system of classification has been proposed by Miss Ames, of Cornell University, who divides the family into groups on the character of the context, and these groups are separated into genera on the form of the fruit body, surface modifications, spore characters, etc. Various workers in Europe have at-

tempted to revise the genera of the *Polyporaceæ* but none of these classifications have been generally adopted by mycologists.

The family is here taken to include the following genera: *Polyporus* (including *Polystictus*), *Fomes*, *Trametes*, *Dædalea*, *Lenzites*, *Cyclomyces*, *Favolus*, *Glæoporus*, *Merulius*, and *Irpeæ*. Distributed among these genera are practically one hundred species found within the state. Of these, 78 have been collected by the writer, 4 others have been sent in by correspondents, and examination has been made of collections of 5 other species taken within the state and preserved either at the Lloyd Museum at Cincinnati, or in the herbarium of the New York Botanical Garden. Of the remaining 12 species some are known only from the records left by Morgan, Lea, Montagne, Berkeley, and Kellerman, others are admitted because there is every reason to believe that they will be found within the state since they are known to have been collected in nearby counties of adjoining states.

The resupinate *Polyporaceæ*, usually included in the genus *Poria*, have been omitted from this paper. Very little is known in this country concerning these forms and very few authentic specimens were available for study and comparison. Most of the species that have been reported from this country have been based on scarcely more than a guess, and it is impossible for the amateur mycologist to determine his material from the confused and often fragmentary account that has been written. Until the genus has been thoroughly studied by a competent mycologist, only added confusion would result from anything more than a reference to it in this paper.

In the preparation of the keys, relationships, both of genera and species, have been entirely ignored, the aim being to produce a usable key rather than to exhibit relationships. The writer believes that the color of the context is one of the most constant of the gross characters of these plants, and the genera are divided into sections on that basis. The presence or absence of a stipe, the duration of the plant, the hymenial configuration, the surface markings of the pileus, etc., are brought into the key in an order which the writer believes corresponds to their relative importance as specific distinguishing characters. Spore characters, especially spore colors, are not used in the separation

of the genera, and in the separation of the species only where experience has shown that the spores are always easily obtained. In many cases it is impossible to obtain spores, especially if they be uncolored, from the hymenium of dried plants. However, when plants are taken in the fresh condition it is usually a simple matter to obtain them by leaving the fungus over night in a moist atmosphere and allowing the spores to fall upon a glass slide. Spores of the perennial woody forms may often be obtained by this method when an examination of the same material in the dried state does not reveal their presence. In this paper spore measurements have been freely taken from other publications, both European and American. This was done in order that the descriptions might be made more comparable. Due credit is given to the author in every case where this was done.

An effort has been made to make the descriptions exactly comparable one with another. For this purpose a definite sequence of presentation has been arranged for the different characters and this order preserved in all but a few instances in which entire descriptions were taken from the original sources. In the comments following each species the characteristic specific distinctions are pointed out and references are made to illustrations of one sort or another that give a good idea of the plant as the writer understands it. Practically all of these references are to papers published in this country. The writer has had access to all of the important publications on the family, both European and American. Most of the European writings are not available to a large part of those students for whom this paper is intended and it was believed that a careful selection of citations to the illustrations published in this country would be of more value than citations to the less known and often inaccessible European publications. Those who are in a position to look up additional references will have access as well to volumes 19 and 20 of Saccardo's '*Sylloge Fungorum*,' where an exhaustive index to illustrations will be found.

It is believed that there can be no question of the need of a paper worked out along the above indicated lines. No such publication exists for any state in the Union and the only aids that students have had in determining their collections have

been either the incomplete "mushroom" books or such extensive works as 'Sylloge Fungorum' and in more recent years the monograph presented in the 'North American Flora.'

In the matter of citation and nomenclature an attempt has been made to follow the rules and recommendations of the International Botanical Congress at Brussels. Since there has been little opportunity to compare specimens of our plants with those of Europe or with type specimens, the procedure in the matter of synonymy has been very conservative. The only names cited as synonyms are those of which the writer has a personal knowledge gained from the examination of authentic material, usually species described from Ohio. Where there has been a doubt as to the identity of a plant in this country with that of one in the old world the procedure has been to use the name under which it has been described or known in this country.

The first and therefore the most complete set of specimens is in the herbarium of the writer; a set of all of the more common forms is in the herbarium of Dr. Bruce Fink, of Miami University, at Oxford, Ohio; a partial set is in the state herbarium, at Columbus; and a large number of species, sent to Dr. Murrill for determination and verification, are in the herbarium of the New York Botanical Garden.

The writer is under deep obligations to the following persons in various ways: First of all to Dr. Bruce Fink, under whose direction the work was begun, whose aid, criticism, and advice has made this publication possible; to Dr. W. A. Murrill, of the New York Botanical Garden, for many kindnesses in verifying and determining specimens sent to him, and for the privilege of studying the specimens in the herbarium at that place; to Mr. C. G. Lloyd, of Cincinnati, for the privilege of working in the Lloyd Library and Museum and for determinations of specimens; to Rev. G. Bresadola, of Trient, Tyrol, for determination of specimens; to Dr. E. A. Burt, of the Missouri Botanical Garden, for access to his herbarium and for suggestions as to the final form of the paper; and to all who have aided in the work by sending specimens and in various other ways.

It is hoped that the paper will be found useful not only to Ohio students but in the neighboring states of the Great Lakes

16. Tubes not in a distinct stratum but appearing to be sunken to different depths into the context.....*Trametes* p. 138
16. Tubes forming a well marked stratum entirely distinct from the context.....*Polyporus* p. 86
17. Hymenium bright yellowish brown; plants growing only on the wood of coniferous trees.....*Trametes* p. 138
17. Hymenium whitish, flesh-colored, dull brown, etc., but not bright yellowish brown; plants growing on the wood of either coniferous or deciduous trees.....*Fomes* p. 126

DESCRIPTIONS AND KEYS TO THE SPECIES

POLYPORUS Mich. ex Fries,

Syst. Myc. 1: 341. 1821; Mich. Nov. Plant. Gen. 129. 1729.

Plants annual or in rare cases persisting for two or three years, terrestrial or epixylous, sessile or stipitate; pileus fleshy, coriaceous or corky in texture, small or of immense size, often brightly colored; context white, yellow, red, or brown; tubes in a single layer, all sunken into the context to an equal depth so that their bases form a definite continuous straight line; mouths mostly circular or angular, in rare cases showing a favoloid or daedaloid tendency and sometimes breaking up into teeth; stipe (when present) variable in position and texture; spores white (bluish in one species), or some shade of brown.

KEY TO THE SPECIES

- Context white or whitish.....Section I.
Context reddish or yellowish.....Section II.
Context brown or brownish.....Section III.

Section I.

- Sporophore stipitate or substipitate..... 1
Sporophore sessile or sometimes effused-reflexed but never stipitate..... 21
1. Pileus and stipe covered with a reddish varnish..... 2
1. Pileus and stipe not red-varnished..... 3
 2. Varnish disappearing with age, the pileus then whitish or yellowish
 61. *P. Curtisii*
 2. Varnish persisting, the pileus not changing color.....60. *P. lucidus*
3. Plant small, not more than 1 cm. high.....29. *P. pocula*
3. Plant always much larger..... 4
 4. Stipe compound, branching near the base; pileoli usually several or many. 5
 4. Stipe simple or not branching more than once; pileus generally single.... 9
5. Pileoli small (usually less than 5 cm. broad) and numerous..... 6
5. Pileoli large (5 cm. or more broad) and few in number..... 7

6. Pileoli regular in outline and centrally attached; the branches of the stipe regular and cylindrical in form 38. *P. umbellatus*
6. Pileoli always laterally attached; the stipe branches irregular. 39. *P. frondosus*
7. Spores roughly echinulate 41. *P. Berkeleyi*
7. Spores smooth 8
8. Pileus pallid or light brown; hymenium usually turning black where bruised and on drying 40. *P. giganteus*
8. Pileus yellowish green; hymenium not turning black 37. *P. flavovirens*
9. Context soft and spongy above, firm next to the hymenium; plants often much distorted; usually growing about stumps 28. *P. distortus*
9. Context uniform; plants not distorted 10
10. Plants growing on the ground 11
10. Plants growing on wood 12
11. Stipe black and rooting at the base; pileus some shade of brown . 36. *P. radicans*
11. Stipe not black and rooting at the base; pileus yellowish green. 37. *P. flavovirens*
12. Sporophore more or less globose; tubes concealed by a volva. 27. *P. volvatus*
12. Sporophore not globose; volva absent 13
13. Sporophore arising from a cup-shaped, sterile body that sometimes disappears; pileus white; found only on dead branches of *Ulmus*. 6. *P. conchifer*
13. Sporophore not arising from a cup-shaped sterile body 14
14. Margin of the pileus projecting 5 mm. or more beyond the hymenium; hymenium separating smoothly from the context in fresh specimens; growing only on *Betula* 26. *P. betulinus*
14. Plants not as above 15
15. Hymenium bright sulphur-yellow 42. *P. sulphureus*
15. Hymenium not bright sulphur-yellow 16
16. Mouths of the tubes minute, averaging 4-7 to a mm. 17
16. Mouths of the tubes larger, averaging 1-3 to a mm. 18
17. Mouths of the tubes averaging 4 to a mm.; pileus rarely more than 5 cm. in diameter 35. *P. elegans*
17. Mouths of the tubes averaging about 6 to a mm.; pileus 4-20 cm. in diameter 34. *P. picipes*
18. Pileus large, more than 5 mm. thick; plant growing on living trees; stipe black at the base 33. *P. squamosus*
18. Pileus small or medium sized, not more than 5 mm. thick; stipe not black at the base 19
19. Tubes long-decurrent on the stipe; context soft and friable when dry 32. *P. pennsylvanicus*
19. Tubes slightly or not at all decurrent; context not soft and friable when dry . 20
20. Pileus yellowish brown; mouths of the tubes almost 1 mm. in diameter; walls thin 31. *P. arcularius*
20. Pileus darker than above, sometimes sooty-black; mouths of the tubes averaging 2 to a mm.; walls at first thick 30. *P. brumalis*
21. Pileus red-varnished, at least when young 22
21. Pileus never red-varnished 23
22. Varnish disappearing with age, the pileus then whitish or yellowish 61. *P. Curtisii*
22. Varnish persistent, the pileus not changing color 60. *P. lucidus*
23. Sporophore more or less globose; tubes concealed by a volva 27. *P. volvatus*
23. Sporophore not globose; volva absent 24

24. Sporophore arising from the under side of a cup-shaped, sterile body;
found only on dead branches of *Ulmus* 6. *P. conchifer*
24. Sporophore not arising from a cup-shaped, sterile body 25
25. Margin of the pileus projecting 5 mm. or more beyond the hymenium;
hymenium separating smoothly from the context in fresh specimens; found
only on *Betula* 26. *P. betulinus*
25. Plants not as above 26
26. Hymenium bright sulphur-yellow 42. *P. sulphureus*
26. Hymenium not bright sulphur-yellow 27
27. Pileus distinctly brown in color; context usually light brown; hymenium
changing color when bruised 46. *P. resinosus*
27. Pileus not brown in color; hymenium never changing color when bruised .. 28
28. Hymenium more or less smoke-colored or black 29
28. Hymenium not at all smoke-colored or black 32
29. Pileus more than 4 mm. thick 30
29. Pileus not more than 4 mm. thick 31
30. Context fragrant, with the odor of anise 23. *P. fragrans*
30. Context not fragrant, odor sometimes disagreeable 24. *P. fumosus*
31. Mouths of the tubes angular, minute, averaging 5-7 to a mm.; dissepiments
thin 22. *P. adustus*
31. Mouths of the tubes circular or subcircular, medium sized, averaging 3-5 to a
mm.; dissepiments thick 24. *P. fumosus*
32. Context fibrous or coriaceous in fresh plants; pileus never more than 1.5
cm. thick, and usually much thinner 33
32. Context either soft, spongy and full of water or firm and corky, often
fragile when dry; pileus often more than 1.5 cm. thick 43
33. Hymenium broken up into teeth 34
33. Hymenium entire or lacerate but not broken up into teeth 36
34. Context more than 1 mm. thick 9. *P. biformis*
34. Context not more than 1 mm. thick 35
35. Plants growing only on the wood of coniferous trees 2. *P. abietinus*
35. Plants growing only on the wood of deciduous trees 3. *P. pargamenus*
36. Context 1 mm. or less thick 37
36. Context more than 1 mm. thick 40
37. Mouths of the tubes minute, averaging 4-6 to a mm.; hymenium never violet
or purple 38
37. Mouths of the tubes larger, averaging 2-3 to a mm.; hymenium often violet
or purple 39
38. Surface of the pileus villous or velvety; pileus multizonate, generally
more than 2 cm. broad 1. *P. versicolor*
38. Surface of the pileus densely hirsute; pileus azonate or with one or two
zones, generally less than 2 cm. broad 4. *P. hirsutulus*
39. Plants growing only on the wood of coniferous trees 2. *P. abietinus*
39. Plants growing only on the wood of deciduous trees 3. *P. pargamenus*
40. Mouths of the tubes large, averaging 1-2 to a mm. 9. *P. biformis*
40. Mouths of the tubes medium sized, averaging 3-4 to a mm. 41
41. Tubes more than 2 mm. long 7. *P. pubescens*
41. Tubes not more than 2 mm. long 42
42. Surface of the pileus velvety to hirsute 5. *P. hirsutus*
42. Surface of the pileus minutely pubescent or glabrous 8. *P. Lloydii*

43. Plants mostly resupinate. 44
43. Plants not mostly resupinate. 45
44. Pileus azonate, margin often inrolled. 10. *P. semipileatus*
44. Pileus zonate, margin always straight. 21. *P. zonatis*
45. Pileus corky in texture when fresh, usually rather thick and firm. 46
45. Pileus soft and spongy in texture when fresh. 49
46. Pileus distinctly encrusted; hymenium and context pinkish or rosy when fresh; plants usually growing on *Fraxinus*. *P. fraxineus*¹
46. Pileus not encrusted; hymenium and context whitish when fresh; plants not usually on *Fraxinus*. 47
47. Pileus more than 2 cm. thick; tubes more than 4 mm. long. 25. *P. robiniophila*
47. Pileus not more than 2 cm. thick; tubes not more than 4 mm. long. 48
48. Plants with a sweet anise odor. 23. *P. fragrans*
48. Plants with no odor, or odor disagreeable. 24. *P. fumosus*
49. Mouths of the tubes minute, averaging 6-7 to a mm.; plants with a sweet acid odor. 14. *P. galactinus*
49. Mouths of the tubes larger, averaging 1-4 to a mm. 50
50. Pileus generally less than 4 cm. broad. 51
50. Pileus generally more than 4 cm. broad. 53
51. Pileus pubescent; mouths of the tubes dentate, lacerate, or irregular. 52
51. Pileus glabrous; mouths of the tubes entire; plants with a sweet acid odor. 12. *P. chioneus*
52. Pileus and spores (in mass) often bluish or slate-colored; tubes equalling in length the thickness of the context. 11. *P. caesius*
52. Pileus and spores pure white; tubes shorter in length than the thickness of the context. 13. *P. lacteus*
53. Plants growing only on the wood of coniferous trees. 54
53. Plants growing only on the wood of deciduous trees. 55
54. Tubes usually more than 5 mm. long, the mouths averaging 2-3 to a mm. 19. *P. borealis*
54. Tubes usually less than 5 mm. long, the mouths averaging 4-5 to mm. 18. *P. guttulatus*
55. Margin of the pileus thick and rounded. 17. *P. obtusus*
55. Margin of the pileus thin and acute. 56
56. Mouths of the tubes large, averaging 1-2 to a mm. 16. *P. delectans*
56. Mouths of the tubes small, averaging 3-5 to a mm. 57
57. Fresh plant with a disagreeable odor; context very hard when dry. 20. *P. Spraguei*
57. Fresh plant with no disagreeable odor. 15. *P. spumeus*

Section II

- Pileus and hymenium deep cinnabar-red. 1
- Pileus and hymenium not deep cinnabar-red (rosy or orange-colored in some species). 2
1. Pileus less than 5 mm. thick, often zonate. 44. *P. sanguineus*
1. Pileus more than 5 mm. thick, never zonate. 45. *P. cinnabarinus*
2. Hymenium bright sulphur-yellow in fresh plants. 42. *P. sulphureus*
2. Hymenium not bright sulphur-yellow. 3
3. Plant growing only on the wood of *Quercus* and *Castanea*; pileus yellowish or orange-colored. 43. *P. Pilotæ*

¹ For description see p. 130 under the genus *Fomes*.

3. Plant growing usually on *Fraxinus*; pileus usually stained more or less with red *P. fraxineus*¹
3. Plant growing usually on coniferous wood; rose-colored without and within... *P. carneus*²

Section III

- Pileus stipitate or substipitate 1
- Pileus sessile or effused-reflexed, not stipitate 9
1. Pileus and stipe covered with a reddish varnish at least when young 2
1. Pileus and stipe not red-varnished 3
2. Pileus and stipe at first red-varnished, the varnish disappearing and the pileus becoming whitish or yellowish when mature 61. *P. Curtisii*
2. Pileus and stipe strongly red-varnished, the varnish not disappearing with age 60. *P. lucidus*
3. Context not more than 1 mm. thick; plants growing on the ground 4
3. Context more than 1 mm. thick; plants growing on wood or attached to buried wood 6
4. Surface of the pileus marked with silky striations 59. *P. cinnamomeus*
4. Surface of the pileus not silky 5
5. Mouths of the tubes small, averaging 2-4 to a mm.; tubes usually less than 3 mm. long 58. *P. perennis*
5. Mouths of the tubes large, averaging 0.5-1 mm. or more in diameter; tubes usually more than 3 mm. long 57. *P. focicola*
6. Surface of the pileus distinctly encrusted *P. lobatus*³
6. Surface of the pileus not at all encrusted 7
7. Context decidedly duplex, spongy above, firm next to the tubes 55. *P. circinatus*
7. Context not duplex 8
8. Hymenium some shade of yellow (yellowish brown, yellowish green, etc.), quickly changing color when bruised; growing on or about trees and stumps of *Pinus*; spores white 54. *P. Schweinitzii*
8. Hymenium cinereous to brownish, not changing color when bruised; growing on the ground or attached to buried wood; spores brown 56. *P. obesus*
9. Pilei forming a densely imbricate, globose or cylindrical mass *P. graveolens*⁴
9. Pilei not forming a densely imbricate, globose or cylindrical mass 10
10. Pileus red-varnished 60. *P. lucidus*
10. Pileus not red-varnished 11
11. Pileus distinctly encrusted *P. lobatus*³
11. Pileus not distinctly encrusted 12
12. Plants growing on or about stumps or trunks of *Pinus* 54. *P. Schweinitzii*
12. Plants growing on wood of deciduous shrubs or trees, often on living trunks 13
13. Context usually less than 7 mm. thick; plants small or medium sized 14
13. Context more than 7 mm. thick; plants large 17
14. Spores white 15
14. Spores brown 16

¹See p. 130 for a description of this plant.²For description of this plant see p. 131 under the genus *Fomes*.³This plant is described on p. 137 under the genus *Fomes*.⁴For description see p. 131 under the genus *Fomes*.⁵For description see p. 137 under the genus *Fomes*.

15. Pileus spongy and watery when fresh; context friable when dry; mouths of the tubes averaging 2-4 to a mm. 47. *P. nidulans*
15. Pileus firm and rigid; context corky when dry; mouths of the tubes minute, averaging 5-8 to a mm. 48. *P. gilvus*
16. Plants growing on the wood of *Alnus* and *Betula*; spores light brown. . . . 49. *P. radiatus*
16. Plants growing on the wood of *Acer*, *Fagus*, and other deciduous trees. . . . 50. *P. cuticularis*
17. Context very light brown. 46. *P. resinolus*
17. Context yellowish brown or darker. 18
18. Surface of the pileus hirsute; plants growing on various diseased deciduous trees. 51. *P. hispidus*
18. Surface of the pileus fibrillose or glabrous; plants growing only on the wood of *Quercus*. 19
19. Sporophore medium sized, less than 10 cm. broad and 3 cm. thick. 53. *P. dryophilus*
19. Sporophore large, more than 10 cm. broad and 3 cm. thick. 52. *P. dryadeus*

1. ***P. versicolor*** L. ex Fries, Syst. Myc. 1: 368. 1821.

Boletus versicolor L. Sp. Plant. 1176. 1753.

Pileus sessile or effused-reflexed, imbricate or single, dimidiate or encircling twigs and then often orbicular by confluence, 2-5 x 2-7 x 0.1-0.3 cm., coriaceous, prevailing color grayish, but marked by many narrow, multicolored zones, ranging from white to yellow, brown, reddish, greenish, blackish, etc., villous or velvety, the margin thin and acute, usually sterile below; context white or whitish, fibrous, less than 1 mm. thick; tubes 1-2 mm. long, the mouths white or yellowish, sometimes somewhat glistening, circular to angular, averaging 3-5 to a mm., the walls thin, entire or slightly lacerate; spores white, smooth, oblong, sometimes curved, 1.2-2 x 5-6.3 μ .

On all kinds of dead wood. Common throughout the year.

Easily distinguished by the multizonate, multicolored pileus. *P. hirsutulus* Schw. is often considered to be a form of this species. *P. zonatus* Fries, as reported by Morgan, is one of the many forms of it. The following references contain good illustrations of our plant: Hard, Mushrooms f. 343., White, Hymen. Conn. pl. 36., and Moffatt, Higher fungi of the Chicago region pl. 17. f. 1.

2. ***P. abietinus*** Dicks. ex Fries, Syst. Myc. 1: 370. 1821.

Boletus abietinus Dicks. Fasc. Pl. Crypt. Brit. 3: 21. 1793.

Pileus sessile or effused-reflexed, dimidiate and broadly attached, or flabelliform and attached by the attenuate base

of the pileus, 0.5–5 x 0.5–5 x 0.1–0.2 cm., coriaceous, white to cinereous or almost black behind, villous, zonate, margin thin and acute; context white or pallid, fibrous, not more than 1 mm. thick; tubes less than 3 mm. long, the mouths white to bay and often violaceous toward the margin, averaging 2–3 to a mm., the dissepiments thin and soon lacerate and breaking up into teeth.

Growing only on the wood of coniferous trees. In autumn. Rare.

Closely related to *P. pargamenus* Fries, from which it is most easily separated by the habitat. The following spore dimensions are found in the literature: Karsten—"oblong 4–6 x 1–3 μ "; Murrill—"globose, smooth, hyaline, 4.5–5.5 μ in diameter"; Bresadola—"hyaline, cylindrical, subcurved, 6–7 x 2.5 μ ."

3. *P. pargamenus* Fries, Epicr. Syst. Myc. 480. 1838.

Pileus sessile or effused-reflexed, imbricate, dimidiate or flabelliform, sometimes attached by an attenuate base, 1–7 x 1–7 x 0.1–0.4 cm., coriaceous, whitish to cinereous or yellowish brown, villous, zonate, the zones sometimes differently colored, margin very thin, acute, broadly sterile below, often violaceous in color; context white or whitish, fibrous, very thin, less than 1 mm. thick; tubes not more than 2.5 mm. long, the mouths whitish to bay and often violaceous toward the margin, angular, averaging 2–3 to a mm., the dissepiments thin and soon breaking up into teeth; spores white, smooth, oblong, slightly curved, 2–2.5 x 5–6.3 μ .

Growing on the wood of deciduous trees, especially of *Quercus* and *Prunus*. September to December. Common.

Close to *P. abietinus* Dicks. ex Fries, but usually found on dead wood of deciduous trees. Well represented by Hard (Mushrooms f. 345) as *P. pergamenus*.

4. *P. hirsutulus* Schw. Trans. Am. Phil. Soc. II. 4: 156. 1832.

Pileus sessile or effused-reflexed, often imbricate, dimidiate, 0.5–2 x 0.5–2.7 x 0.1–0.2 cm., coriaceous, gray or cinereous to yellowish brown, hirsute or strigose, azonate or with 2–3 colored zones, margin thin and acute, usually sterile below; context white or whitish, membranous, less than 1 mm. thick; tubes less than 2 mm. long, mouths whitish to yellowish, rarely

glistening, circular or angular, averaging 3–5 to a mm., the dissepiments thin and entire.

On dead branches of deciduous trees, more often on fruit trees. Found from August to December. Not common.

Separated from *P. versicolor* L. ex Fries, by the more hirsute or strigose pubescence on the pileus, and by the smaller size. Specimens collected at Cincinnati by D. L. James and referred to *P. velutinus* Fries are now referred to this species.

5 *P. hirsutus* Wulfen, ex Fries, Syst. Myc. 1: 367. 1821.

Boletus hirsutus Wulfen, in Jacq. Coll. 2: 149. 1788.

Pileus sessile, or effused-reflexed, dimidiate, 1.5–5 x 1.5–7 x 0.2–1 cm., flexible when moist, firm and sometimes rigid when dry, grayish to yellowish or smoky brown, hirsute or tomentose, sometimes zonate, sometimes concentrically sulcate, the margin thin or rather thick, acute, sometimes dark colored; context white or pallid, tough to soft-corky, 1–6 mm. thick; tubes 1–4 mm. long, the mouths white, grayish or fuliginous, circular to somewhat angular, averaging 3–4 to a mm., the walls rather thick and always entire; spores white, smooth, cylindrical, often curved, 2.5 x 5–8 μ .

On dead wood of deciduous trees. Found throughout the year.

From closely related species with a conspicuous hairy covering this plant is perhaps most easily separated by the persistently thick walled tubes that never become torn or lacerate. Any plant with the characteristics of this group and possessing the dark-colored marginal band to which reference is made in the description may always with safety be referred to this species. From *P. versicolor* L. ex Fries, the plant is separated by the absence of the numerous multicolored zones. Hard's figure (Mushrooms f. 342) is not a good illustration of our plant. Murrill describes the plant under the name of *Coriolus nigromarginatus* (Schw.) Murr.

6. *P. conchifer* Schw. ex Fries, Epier. Syst. Myc. 463. 1838.

Boletus conchifer Schw. Syn. Fung. Car. 98. 1822.

Pileus sessile or attached by a lateral tubercle and then appearing substipitate, reniform to dimidiate in outline, 1–3 x 1–4 x 0.1–0.3 cm., coriaceous, white to yellowish, glabrous,

zonate or azonate, the margin very thin and acute; on the upper surface and at the base of the pileus a small cup-shaped or disk-like sterile structure is usually borne, white or brown and often zoned on the inside; context white, fibrous, less than 1 mm. thick; tubes not more than 2 mm. long, at first white, often yellowish on drying, the mouths angular and thin-walled averaging about 3 to a mm., the dissepiments often lacerate; stipe (?) rudimentary, tubercular; spores not obtained.

Growing only on fallen branches of *Ulmus*. Common.

This plant has somewhat the appearance of *P. pubescens* Schum. ex Fries, from which, however, it is easily separated by the much thinner pileus, the attenuate base, the presence of the sterile cup, and the habitat. The cup is sometimes absent. The development of the cup has not been closely followed. Lloyd believes that the fertile pileus is first developed and from it the sterile cup arises, and that during the winter the fertile portion falls away, the cup persisting on the substratum but not giving rise to new pilei the next season. Miss Ames comes to the conclusion that the sterile cups represent pilei whose marginal hyphæ have been killed by unfavorable conditions and which as a result may develop a fruiting surface from the base of the dead cup-like pileus. This would explain the occasional absence of the sterile cup, its presence depending upon the death of the marginal hyphæ in the early stages of the production of a first pileus. *P. virgineus* Schw. described from North Carolina is said to be this plant. The plant is exceptionally well illustrated by Lloyd (Myc. Notes, Polyporoid Issue 3 f. 365-66), and by Moffat (Higher fungi of the Chicago region pl. 16. f. 2).

7. *P. pubescens* Schum. ex Fries, Syst. Myc. 1: 367. 1821.

Boletus pubescens Schum. Enum. Pl. Saell. 2: 384. 1803.

Polyporus Sullivantii Mont. Ann. Sci. Nat. II. 18: 243. 1842.

Pileus sessile, dimidiate, 1.5-5 x 2.5-5 x 0.4-1 cm., fleshy-tough when fresh, firm when dry, white or yellowish in fresh specimens, sometimes umber or brown when dry, villous-tomentose, zonate or azonate, margin thin, acute; context white or pallid, fibrous-tough when fresh, more firm when dry, 1-5 mm. thick; tubes 1-4 mm. long, the mouths white, yellowish, or umber, angular, averaging 3-4 to a mm., the

dissepiments thin, entire to dentate; spores white, smooth, cylindrical, curved, $2.7-3.6 \times 5.4 \mu$.

On dead wood of deciduous trees. August to November. Common.

Plants collected in the Miami valley by Morgan and referred by him to *P. velutinus* Fries belong here. Plants distributed by Kellerman in his 'Fascicles of Ohio Fungi' as *P. molliusculus* Berk. are referred to this species. *P. fibula* Fries as reported by Morgan is probably the same as *P. pubescens* var. *Grayii*, here included under *P. pubescens*. Hard (Mushrooms f. 339) gives a good illustration of the plant.

8. *P. Lloydii* (Murr.) Overholts, n. comb.

Coriolus Lloydii Murrill, N. Am. Flora 9: 23. 1907.

Pileus rather thin, laterally connate, rigid, tough, cuneate to flabelliform, applanate, tubercular-sessile, $2-3 \times 3-4 \times 0.2-0.4$ cm.; surface white or isabelline, scabrous, somewhat rugose, marked with a few narrow, indistinct, pale latericeous zones; margin thin, fertile, irregular, lobed; context punky-fibrous, white, 1.5–2 mm. thick; tubes 1–1.5 mm. long, white within, mouths angular, subglistening, 4 to a mm., edges thin, firm, dentate, white or isabelline; spores globose, smooth, hyaline, 2μ ; hyphæ 5μ .

On dead wood. Rare.

The above description is taken from the 'North American Flora.' The type specimens were collected near Cincinnati, Ohio, by C. G. Lloyd, and to the writer's knowledge the plant has not been found since. The species appears to be distinct.

9. *P. biformis* Klotzsch, Linnaea 8: 486. 1833.

P. molliusculus Berk. Hooker's Lond. Jour. Bot. 6: 320. 1847.

Plants sessile, effused-reflexed or resupinate, often imbricate; pileus dimidiate or laterally confluent and elongate, $0-5.5 \times 1.5-6 \times 0.2-1.5$ cm., soft and pliable when fresh, slightly flexible to rigid when dry, white, pallid, bay, or ochraceous, appressed-fibrillose, usually rough, azonate or subzonate, the margin thin and acute; context white or whitish, fibrous-tough when fresh, soft-corky when dry, 1–5 mm. thick; tubes white, becoming bay on drying, 2–5 mm. long, the mouths circular to angular or sinuous, averaging 1–2 to a mm., the dissepiments

rather thin and usually becoming lacerate and broken up into teeth at an early stage of growth, sometimes remaining poroid, especially toward the margin of the pileus; spores white, smooth, oblong, curved, $2-2.6 \times 7-8 \mu$.

Growing on old logs. September to December. Common.

The following group of characters will usually identify the species: the semi-resupinate habit of growth, whitish or tan-colored pileus, and the rather long tubes with large mouths, soon breaking up into teeth. *P. molliusculus* was named by Berkeley from specimens sent to him from Ohio by Lea. Morgan's determination of *P. molliusculus* was an error, his plants belonging to *P. pubescens* Schum. ex. Fries. Kellerman repeated the error in distributing *P. molliusculus* in his 'Ohio Fungi Fascicles.' For illustration see Hard, Mushrooms f. 341.

10. *P. semipileatus* Peck, Ann. Rept. N. Y. State Mus. 34: 43. 1881.

Plants resupinate or effused-reflexed, rarely strictly sessile; pileus dimidiate or elongate, $0-1.5 \times 0.7-3.5 \times 0.1-0.5$ cm., soft and spongy when fresh, rigid when dry, white, yellowish, or reddish brown, slightly tomentose to glabrous, azonate, margin thin, acute; context whitish, soft when fresh, firm when dry, 1-4 mm. thick; tubes less than 2 mm. long, the mouths white, greenish or somewhat violaceous, angular, minute, averaging 4-6 to a mm., the walls entire; spores white, smooth, oblong, curved, $1 \times 3-4 \mu$.

On old limbs on the ground. September to December. Rare.

Easily recognized by the minute pores, the semi-resupinate habit of growth, and the often violet tinted hymenium. There is no previous record of the plant occurring in Ohio. Collections were made at Oxford, in 1911, for the first time.

11. *P. caesius* Schrad. ex Fries, Syst. Myc. 1: 360. 1821.

Boletus caesius Schrad. Spic. Fl. Ger. 167. 1794.

Pileus sessile or effused-reflexed, dimidiate, $1-3.5 \times 2-6 \times 0.3-2$ cm., soft and spongy when fresh, rigid when dry, whitish to cinereous, often with a bluish tinge, distinctly villous or tomentose especially behind; azonate, margin thin and acute; context white, soft, spongy and full of water when fresh, friable when dry, 0.3-1 cm. thick; tubes 2-7 mm. long, mouths white, pallid, or bluish gray, angular, averaging 3-5 to a mm., the

walls thin and usually lacerate; spores minute, white, smooth, cylindrical, sometimes curved, $1.2-1.5 \times 4.7-5.2 \mu$.

On dead wood of deciduous and coniferous trees. October to December. Rare.

The bluish color of the pileus and hymenium is so often wanting that other characters must frequently be used in the identification of the plant. The slender tubes, usually longer than or as long as the thickness of the context, is apparently a rather constant character of the plant. The villous or tomentose pileus separates it from *P. chioneus* Fries and *P. lacteus* Fries and these are the only species with which it is likely to be confused.

12. *P. chioneus* Fries, Syst. Myc. 1: 359. 1821.

Pileus sessile, dimidiate, $1-3 \times 2-5 \times 0.5-3$ cm., soft and spongy when fresh, rigid when dry, whitish to grayish or yellowish, azonate, glabrous or with a slight strigose tomentum towards the base, sometimes covered with a thin grayish or yellowish pellicle that becomes more evident on drying; margin acute, sometimes inflexed on drying; context white, soft and spongy when fresh, fragile when dry, $0.3-2$ cm. thick, azonate, with a sweet acid odor; tubes $1-8$ mm. long, mouths white or yellowish, usually glistening, angular, averaging $3-4$ to a mm., the walls thin but entire; spores white, smooth, oblong, slightly curved, $1-1.7 \times 4-5 \mu$.

On dead wood. September to November.

From *P. galactinus* Berk. this plant is most easily separated by the oblong, curved spores. The usually glabrous pileus and the absence of bluish tints separates it from *P. caesius* Schrad. ex Fries. Whether it is distinct from *P. lacteus* Fries may well be doubted. The plant is much in dispute in Europe. Our plants have been described as *P. albellus* Peck.

13. *P. lacteus* Fries, Syst. Myc. 1: 359. 1821.

Pileus pure white, fleshy-fibrous, fragile, triangular, pubescent, azonate externally and internally, margin inflexed, acute; pores thin acute, dentate, becoming torn and labyrinthiform. Commonly small and thin but sometimes large and transversely elongate, often gibbous behind, becoming glabrate and uneven. (Adapted from Fries, Hymen. Eur. 546.)

On dead wood of deciduous trees. Rare.

Until quite recently this and the preceding species have been held to be quite distinct. Of late years the European mycologists are coming to believe that they cannot be regarded as distinct species. Merrill would separate them on the ground that *P. chioneus* always has a distinct cuticle which is entirely lacking in *P. lacteus*. The writer has endeavored to keep the plants distinct on the basis of the differences noted by Fries. If this proves unfeasible then the two must be united as one species under the name of *P. chioneus*, at least with reference to their occurrence in this country.

14. *P. galactinus* Berk., Hooker's Lond. Jour. Bot. 6: 321. 1847.

Pileus sessile, imbricate or single, dimidiate, 3-7 x 3-7 x 0.5-2 cm., soft and pliant when fresh, more or less watery, rigid and contorted on drying, white, grayish, or somewhat yellowish, tomentose to strigose-tomentose, especially at the base, becoming glabrous with age, azonate, margin thin and acute; context white or pallid, watery and spongy when fresh, with a distinct sweet acid odor, firm when dry, sometimes more or less duplex, 3-8 mm. thick; tubes 2-7 mm. long, mouths white to bay, often glistening, circular to angular or sinuous, minute, averaging about 6 to a mm.; spores white, smooth, ellipsoid, 2-2.5 x 3.5-4 μ , uninucleate and with a very transparent wall.

Growing on dead wood of deciduous trees. August to November. Common.

The sweet acid odor mentioned in the description is a distinguishing character of all collections of this species. No mention is made of the odor in any published work to the writer's knowledge, except in Peck's description of *P. immitus* in which the odor is described as subacid. *P. immitus* is in all probability this plant. The odor is so constant that whenever it is noticed in connection with any minute-pored form of this section one can be sure that the plant belongs to this species.

All of the collections that I have referred to this species are watery when fresh, have a sweet acid odor, and when dried shrink much in size and often become much contorted. The context becomes thin and hard and takes on a resinous, dark brown or black color. This appearance may be uniform through

the context or the dark resinous color may be limited to a narrow line next to the hymenium or confined to two or three narrow zones in the context. It is difficult to distinguish these species with a white watery context and the writer's presentation of them may be open to criticism.

15. *P. spumeus* Sow. ex Fries, Syst. Myc. 1:358. 1821.

Boletus spumeus Sow. Col. Fig. Eng. Fungi pl. 211. 1797.

Pileus sessile, dimidiate, watery and fleshy-tough when fresh, firm when dry, 7–12 x 10–20 x 2–3 cm., much smaller on drying, appearing appressed-tomentose, white or grayish, somewhat yellowish or brownish on drying, azonate, margin rather thick but acute; context white, soft, spongy, and full of water, rather fragile on drying, more or less zonate, 1–3 cm. thick; tubes 0.5–1.5 cm. long, mouths white or yellowish on drying, angular, averaging 3 to a mm.; spores white, smooth, globose, or subglobose, 4.5–5.2 μ in diameter, distinctly uninucleate.

Growing on injured or diseased deciduous trees, especially *Ulmus* and *Acer*. October and November. Rare.

The plant is closely related to *P. delectans* Peck, with the same habitat and general appearance, but separated from that species by the smaller mouths of the tubes and by the distinctly uninucleate and more globose spores. The plants so referred do not agree with the figure given by Sowerby, nor with Fries' description. My plants were determined by Bresadola.

16. *P. delectans* Peck, Bull. Torr. Bot. Club 11:26. 1884.

Pileus sessile, sometimes imbricate, dimidiate in outline, 3–7 x 4–15 x 0.7–3 cm., rather spongy and watery when fresh, firm and rigid when dry, white or whitish, finely tomentose or glabrous, azonate, margin thin and acute; context white, in large specimens duplex, with a firm lower layer and a soft upper layer, in smaller specimens more uniform, 0.5–1.5 cm. thick; tubes 0.5–1.5 cm. long, mouths white, yellowish on drying, circular to angular, large, averaging 1–2 to a mm.; spores white, smooth, ellipsoid to globose, 4.5–5.5 x 6.5–8.5 μ .

On diseased or injured trunks of deciduous trees, especially *Acer*; sometimes on logs of *Fagus*. September to December. Frequent.

The species is separated from *P. spumeus* Sow. ex Fries by the larger tube mouths and the less globose spores that have

not been observed to be uninucleate as in that species. It is a large white fungus distinct from the other allied species in size, length of tubes, and habitat.

17. *P. obtusus* Berk. Ann. & Mag. Nat. Hist. I. 3: 390. 1839.

Plants annual, sessile, sometimes imbricate; pileus dimidiate, convex or unguulate, 3–9 x 4–15 x 3–6 cm., somewhat spongy when fresh, firm, rigid, and very light in weight when dry, cinereous to yellowish or darker in herbarium specimens, hirtose-tomentose, rarely becoming glabrous, azonate, margin thick, obtuse; context white or whitish, spongy to corky, sometimes duplex, 1–3 cm. thick; tubes 1.5–3 cm. long, the mouths white, bay or brown on drying, circular to angular and sinuous, 1 mm. or more in diameter; spores (teste Murrill) globose, smooth, hyaline, 6–8 μ .

On trunks of diseased deciduous trees, especially *Quercus*. Rare.

Always easily recognized by the rounded and obtuse margin, and the long tubes with large mouths. Excellent illustrations are given by Spaulding (Ann. Rept. Mo. Bot. Gard. 16: pl. 13–19).

18. *P. guttulatus* Peck, in Sacc. Syll. Fung. 6: 106. 1888.

P. maculatus Peck, Ann. Rept. N. Y. State Mus. 26: 69. 1874.

Pileus sessile, sometimes imbricate, dimidiate, 3–8 x 5–12 x 0.4–1.5 cm., soft and fleshy when fresh, firm and rigid when dry, white to yellowish or slightly brownish, glabrous, azonate or sometimes zonate on the margin, sometimes marked with rounded depressed spots, margin thin, acute; context white or pallid, soft and fleshy when fresh, soft-corky or friable when dry, 0.4–1 cm. thick; tubes 1–5 mm. long, the mouths white to yellowish or umbrinous, angular, averaging 4–5 to a mm.; spores white, smooth, oblong-ellipsoid, 2.5–3 x 3–5 μ . (Cf. Murrill, globose, smooth, hyaline, 5 μ in diameter.)

Growing on wood of coniferous trees. Rare.

The distinguishing character of the species is the presence of the round depressed spots on the pileus.

19. *P. borealis* Fries, Syst. Myc. 1: 366. 1821.

Pileus sessile, dimidiate, sometimes with an attenuate base, 3–8 x 4–12 x 0.5–2.5 cm., somewhat watery and spongy when fresh, rigid when dry, white or yellowish, sometimes brownish, hispid to tomentose, azonate, margin thin and acute; context

white or yellowish, distinctly duplex, firm and fibrous below, soft and floccose above, 0.5–2 cm. thick; tubes 3–10 mm. long, the mouths white or yellowish, angular to irregular and uneven, rather large, averaging 2–3 to a mm.; spores (teste Murrill) ovoid, smooth, hyaline, 5–6 x 3–4 μ .

Growing only on trunks of coniferous trees. Rare.

The species is most easily separated from its allies by the size and habitat. For illustrations see Atkinson, *Mushrooms f. 9.*, Duggar, *Fung. Dis. Plants f. 228.*, and Atkinson, *Cornell Univ. Agr. Exp. Sta. Bul. 193: f. 63.*

20. *P. Spraguei* Berk. & Curt. *Grevillea* 1: 50. 1872.

Plants annual, sessile or decurrent, sometimes imbricate; pileus dimidiate, 4–12 x 4–10 x 0.6–2 cm., fleshy-tough when fresh, rigid when dry, white or cinereous, appressed-tomentose or glabrous, azonate or somewhat zonate, margin thin or rather thick, acute, often blackening on drying; context white, watery, tough-fibrous when fresh, sometimes very hard when dry, zonate, 0.3–1.5 cm. thick, with a disagreeable odor in fresh specimens; tubes 0.3–1 cm. long, mouths white or discolored, circular or angular, averaging 3–4 to a mm.; spores (teste Murrill) ellipsoidal smooth, hyaline, 6 x 4 μ .

On dead wood of deciduous trees, especially on *Fagus*, *Quercus*, and *Castanea*. July to September. Common.

Fresh specimens are always easily distinguished by the very disagreeable odor. Dried plants are characteristically very hard and rigid, the context almost bony in texture.

21. *P. zonalis* Berk. *Ann. & Mag. Nat. Hist. I.* 10: 375. 1842.

Plants annual, sessile, effused-reflexed, or entirely resupinate; pileus dimidiate or laterally confluent, 0–2.5 x 1–5 x 0.2–0.5 cm., fleshy and pliable when fresh, rigid and firm when dry, whitish to flesh-colored or isabelline, finely tomentose to glabrous, at first azonate but becoming zoned when mature, the margin at first thick, thin with age; context white, fibrous when fresh, hard and rigid when dry, 1–2 mm. thick; tubes 1–3 mm. long, the mouths usually more or less flesh-tinted when fresh, angular, averaging 4–5 to a mm., the walls thick and entire, very firm and rigid on drying; spores white, smooth, globose, 2.5–5 μ broad, with one large nucleus.

On old rotting logs, especially of *Liriodendron*. August to December. Not common.

The writer has collected this plant several times in the Miami valley, almost always on logs of *Liriodendron tulipifera*. The plant is usually entirely resupinate and has doubtless been described as a *Poria*, but good collections were made which showed beyond a doubt the pileate tendency of the plant. No disposition could be made of the plant until Dr. Murrill suggested that it might belong to *P. zonalis*. Later, specimens were sent to Rev. Bresadola who pronounced it that species and an opinion recently received from Mr. Lloyd expresses the same view. It is, however, quite different from the usual forms of that plant and the name is used with some apprehension. The plant is also abundant in Missouri where the writer has found the pileate forms to be much more common than in Ohio. *P. zonalis* has been supposed to be confined to the Gulf States in this country, although it is not surprising that semi-tropical forms found there should extend their range up the large river valleys to the north.

22. *P. adustus* Willd. ex Fries, Syst. Myc. 1: 363. 1821.

Boletus adustus Willd. Fl. Berol. 392. 1787.

Plants annual, sessile, effused-reflexed, or resupinate; pileus dimidiate, often imbricate, 1-6 x 2-7 x 0.2-0.4 cm., fleshy-tough when fresh, coriaceous or rigid when dry, white to cinereous or pale tan, fibrillose-tomentose to almost glabrous, zonate or azonate, the surface usually rough, margin thick and broadly sterile below when young, becoming thin when mature; context white or pallid, rather soft when fresh, corky or fibrous-corky when dry, 1-3.5 mm. thick; tubes not more than 1 mm. long, the mouths grayish black to black, angular, even, minute, averaging 5-7 to a mm.; spores white, smooth, oblong to oblong-ellipsoid, 2-2.5 x 3.8-4.3 μ .

On stumps and trunks of dead deciduous trees. August to December.

This species differs from *P. fumosus* Pers. ex Fries and *P. fragrans* Peck in the smaller size and the uniformly black hymenium.

23. *P. fragrans* Peck, Rept. N. Y. State Museum 30: 45. 1879.

Plants annual, sessile or effused-reflexed; pileus dimidiate, imbricate, 2–8 x 4–10 x 0.5–2 cm., fleshy-tough when fresh, firm and rigid when dry, cinereous to reddish gray, finely tomentose to almost glabrous, subzonate or azonate, the margin thin and acute; context whitish or pallid, tough when fresh, soft-corky when dry, 4–8 mm. thick, with a sweet anise-like odor that persists in dried plants; hymenium sometimes separated from the context by a narrow, dark-colored line; tubes less than 4 mm. long, the mouths whitish or somewhat smoke-colored, blackish when bruised, angular, the dissepiments becoming dentate and the mouths unequal in size, averaging 3–4 to a mm.; spores (teste Murrill) white, globose to ovoid, smooth, 5–6 μ in diameter.

On stumps and trunks, especially of *Ulmus*. Frequent.

The distinguishing characters of this species are the fragrant odor and the unequal and irregular pores—characters which separate it from *P. adustus* and *P. fumosus*. The name *P. puberula* Berk. & Curtis is sometimes applied to this plant.

24. *P. fumosus* Pers. ex Fries, Syst. Myc. 1: 367. 1821.

Boletus fumosus Pers. Syn. Fung. 530. 1801.

Plants annual, sessile or effused-reflexed; pileus dimidiate, often imbricate, 2–7 x 3–8.5 x 0.3–2 cm., somewhat fleshy-tough when fresh, firm and rigid when dry, grayish to very pale tan-colored, finely tomentose, subzonate or azonate, margin thin and acute; context white to light umber, soft corky when fresh, corky when dry, 0.3–2 cm. thick, with a rather disagreeable odor; hymenium separated from the context by a distinct, narrow, dark-colored line; tubes short, not more than 3 mm. long, the mouths whitish or smoky, blackish when bruised, circular to somewhat angular but thick-walled and entire, averaging 4–6 to a mm., spores white, smooth, elliptical to subcylindrical, 2.6–4 x 5.3–7.2 μ .

Growing on dead wood of deciduous trees. October to December. Frequent.

Distinguished from *P. fragrans* Peck by the more circular and entire tube mouths and, in our plants at least, by the absence of the fragrant, anise-like odor. The odor is disagreeable in

the fresh plants but disappears on drying. Bresadola ascribes a subanise odor to the plant at times. The plants are, however, closely related and one may expect to find intermediate forms that are difficult to refer to either species. Thin, semi-resupinate forms are often scarcely distinguishable from *P. adustus* Willd. ex Fries. The plant is illustrated by Bresadola (*Fungi Trident. pl. 135*).

25. *P. robiniophila* (Murr.) Overholts, n. comb.

Trametes robiniophila Murr. N. Am. Flora **9**: 42. 1907.

Plants annual, sessile, rarely imbricate; pileus dimidiate, fleshy-tough or somewhat coriaceous when fresh, firm and rigid when dry, 3.5–10 x 4–15 x 1–4 cm., white to cinereous or yellowish, finely tomentose to glabrous, azonate or rarely subzonate or concentrically sulcate in large specimens, margin at first thick and obtuse, becoming thin and acute when mature; context white, fleshy-tough when fresh, soft and punky when dry, 0.5–3 cm. thick, usually with a sweet anise-like odor developing in herbarium specimens; tubes 0.3–1 cm. long, mouths white, often bay or brownish in dried plants, circular to angular, averaging 4–6 to a mm., the walls thick and entire; spores white, smooth, ovoid to subglobose, 5.5–7 x 7–8.5 μ .

On deciduous trees, especially *Robinia*, *Celtis*, and *Acer*. August to December. Common.

Dried plants are characterized by the tough, punky context and the sweet odor, as well as by the large size of the plant, the long tubes, the minute mouths, and the habitat. The plant was first described as a *Trametes* but it appears to belong rather to *Polyporus*.

26. *P. betulinus* Bull. ex Fries, Syst. Myc. 1: 358. 1821.

Boletus betulinus Bull. Herb. Fr. *pl. 312*. 1786.

Pileus sessile or attached by a prominent lateral umbo, dimidiate to circular in outline, 3–9 x 3–15 x 1–5 cm., somewhat fleshy when young, firm and rigid when dry, glabrous, azonate, smooth, covered with a thin pellicle, margin more or less incurved, with a wide sterile band on the lower surface; context white, somewhat fleshy when fresh, soft-corky when dry, 1–3.5 cm. thick; tubes 3–8 mm. long, mouths white, circular to angular, averaging 3–4 to a mm.; hymenium at times covered by projecting setae, sometimes as much as 2 mm. long; tubes separat-

ing in a smooth layer from the context; spores (teste Murrill) white, cylindrical, curved, 4–5 μ long.

Growing only on *Betula*. Not common.

Always easily recognized by the habitat, the smooth, pelliculose surface and the inrolled, broadly sterile margin of the pileus. Good illustrations are given by Freeman (Minn. Plant Diseases f. 126), Hard (Mushrooms f. 337), White (Hymen. Conn. pl. 37), and Kellerman (Ohio Myc. Bul. 10: f. 43).

27. *P. volvatus* Peck, Rept. N. Y. State Mus. 27: 98. 1875.

Plants annual, sessile or attached by a stem-like base; pileus globose or compressed-globose in form, 1–5.5 cm. broad, 1–3.5 cm. thick, somewhat coriaceous-corky when fresh, hard and firm when dry, somewhat encrusted, whitish or yellowish, sometimes tinged with red, glabrous, azonate, margin thick and rounded, extending downward and backward and forming a veil-like covering over the hymenium; context white or light colored, soft-corky, 0.2–1 cm. thick; tubes 2–5 mm. long, the mouths whitish to brownish, circular, averaging 3–4 to a mm.; the covering over the hymenium ruptures in from one to three places and allows the escape of the spores; spores (teste Peck) flesh-colored, elliptical, 5 x 7.5–9 μ .

On dead wood of coniferous trees. Rare.

An aberrant form easily recognized by the veil-like covering of the hymenium. This is persistent, being coriaceous in texture and as much as 1 mm. thick. Peck's illustration (Rept. N. Y. State Mus. 27. pl. 2. f. 3–6) gives some idea as to the general form of the plant; Hard's (Mushrooms f. 340) is not much better. von Schrenk gives a good illustration (U. S. Dept. Agr., Div. Veg. Path. Bul. 25: pl. 1. f. 2).

28. *P. distortus* Schw. ex Fries, Elench. Fung. 1: 79. 1828.

Boletus distortus Schw. Syn. Fung. Car. 97. 1822. *Polyporus abortivus* Peck, Bot. Gaz. 6: 274. 1881.

Plants stipitate or substipitate, variable in form and size, sometimes with a distinct, well developed, centrally placed stipe, sometimes the whole plant distorted and the stipe rudimentary, often almost the entire surface of such forms covered with the tubes; pileus circular to irregular in outline, fleshy-tough when fresh, firm and coriaceous when dry, variable in color, whitish, grayish, tan-colored, rufescent, or brownish, vil-

lous-tomentose, soft to the touch, azonate, margin thin and acute or thick and obtuse; context white or whitish, with a firm corky layer next to the hymenium and a lighter colored, softer layer above, the whole 0.2–1 cm. thick; tubes in well developed specimens 1–6 mm. long, whitish or rufescent when bruised, mouths angular to dædaloid and irregular, averaging 1–3 to a mm.; stipe central, lateral, or wanting, rarely well developed and up to 6 cm. long, more often rudimentary and tubercular, clothed like the pileus, soft on the outside and firm within; spores white, smooth, subglobose, 5.5–8.5 μ in diameter; conidial (?) spores sometimes present, white, smooth, ovoid to elliptical, 3.3–4.2 x 5.2–7.8 μ .

Usually growing about stumps and probably always attached to buried wood. Common.

Well developed specimens of this plant will be easily recognized by the duplex context and the soft, villous pileus; abnormal specimens by their distorted appearance. The duplex context is always more easily recognized in dried specimens. According to Lloyd our plant is identical with *P. rufescens* Fries of Europe. See Lloyd, Syn. Stip. Polyp. f. 458., for illustration of one form of the distorted plant.

29. *P. pocula* Schw. ex Berk. & Curt. Proc. Am. Acad. Arts Sci. 4: 122. 1858.

Sphaeria pocula Schw. Jour. Acad. Nat. Sci. Phil. 5: 7. 1825.
Enslinia pocula Schw. ex Fries, Summ. Veg. Scand. 2: 399. 1849.

Pileus short-stipitate, pendant from dead branches, circular in outline, 1–5 mm. in diameter, 1–3 mm. thick, coriaceous when fresh, rigid when dry, whitish to brown in color, pruinose or mealy, azonate; context coriaceous when fresh, hard when dry, less than 1 mm. thick; tubes not more than 0.5 mm. long, mouths at first appearing pruinose, whitish or brownish, circular, very minute, averaging 5–6 to a mm.; stipe dorsally attached, concolorous with and expanding into the pileus, pruinose, not more than 5 mm. long; spores (teste Murrill) globose, smooth, hyaline, 4 μ in diameter.

On dead branches, especially of *Quercus* and *Castanea*. Rare.

This is the smallest known polypore and easily identified by its size and habit of growth. It was first described as an asco-

mycete (*Sphaeria*) by Schweinitz and later transferred to the genus *Enslinia* (*Pyrenomycetes*) by Fries. Excellent illustrations are given by Lloyd (Myc. Notes, Polyp. Issue 3: f. 369–70; Syn. Stip. Polyp. f. 443).

30. *P. brumalis* Pers. ex Fries, Syst. Myc. 1: 348. 1821.

Boletus brumalis Pers. Neues Mag. Bot. 1: 107. 1794.

Pileus stipitate, circular in outline, sometimes somewhat umbilicate in the center, 1.5–5 cm. broad, 0.2–0.4 cm. thick, fleshy-tough when fresh, rigid when dry, varying in color from yellowish brown to dark brown or almost black, minutely hispid to glabrous, rarely slightly squamulose, usually azonate but at times distinctly zoned, margin thin and entire, involute when young and incurved on drying; context white or pallid, soft-fibrous when fresh, firm when dry, 2 mm. or less thick; tubes 1–3 mm. long, usually slightly decurrent, the mouths white or whitish, at first circular and thick walled, later angular and the dissepiments thinner, averaging 2–3 to a mm.; stipe central or subcentral, simple, cylindrical, grayish or brownish, minutely hispid or glabrous, 2–3 cm. long, 0.2–0.3 cm. thick; spores white, oblong, sometimes slightly curved at one end, smooth, $2.5 \times 9 \mu$.

Growing on dead wood in the fall and early winter. Common.

P. brumalis and *P. arcularius* are closely related species that are not always easy to separate. In general the forms occurring in the early spring and summer are likely to be *P. arcularius*, while those found in autumn and often late in winter are more likely to be *P. brumalis*. Hard (Mushrooms f. 335) gives a good illustration of the plant.

31. *P. arcularius* Batsch. ex Fries, Syst. Myc. 1: 342. 1821.

Boletus arcularius Batsch. El. Fung. 97. 1783. *P. arculariformis* Murrill, Torreyia 4: 151. 1904.

Pileus stipitate, circular in outline, convex to umbilicate, sometimes infundibuliform, 1–8 cm. broad, 1–4 mm. thick, fleshy-tough or coriaceous when fresh, rigid when dry, golden brown to dark brown, usually more or less squamulose, azonate, the margin usually distinctly ciliate, involute on drying; context white or pallid, fibrous-fleshy when fresh, compact-fibrous when dry, less than 2 mm. thick; tubes 1–2 mm. long, often decurrent, the mouths white, discolored on drying, angular and

often radially elongate, averaging 2 to a mm. in transverse direction and about 1 to a mm. in axial direction; stipe central or subcentral, concolorous with the pileus, fuscous-squamulose to glabrous above, often hispid at the base, 2-6 cm. long, 2-4 mm. thick; spores white, smooth, elliptical-cylindrical, usually 2-3 guttulate, 2-3 x 6-8.5 μ .

On dead wood. Common.

This species is much more common than the preceding and is distinguished from it by the lighter colored pileus, the ciliate margin, the hispid stipe base, and the larger and more alveolar tubes. Is usually found in the spring and early summer. A small form of it with the pileus not more than 1 cm. in diameter is especially common on twigs and bits of wood during the late spring and early summer. Murrill regards this form as a distinct species and has named it *P. arculariformis* (Torreya 4: 151). It is here maintained as a form of *P. arcularius*. This species is well represented by Hard (Mushrooms f. 336).

32. *P. pennsylvanicus* Sumstine, Jour. Myc. 13: 137. 1907.

Pileus stipitate, circular in outline, depressed, sometimes umbilicate or somewhat infundibuliform, 4-6.5 cm. in diameter, 0.2-0.5 cm. thick, fleshy-tough, pale tan or ochraceous buff in color, with a thin cuticle, glabrous, azonate, margin thin and acute; context white, soft and watery when fresh, with a sweet acid odor, rather fragile when dry, 2-4 mm. thick; tubes white at first, discolored on drying, long decurrent on the stipe, 2-4 mm. long, mouths angular, thin walled, large, somewhat longer in the radial direction, 1-2 mm. long, 0.5 to 1 mm. wide; stipe central or excentric, whitish, glabrous, expanding above, 2-3 cm. long, 0.4-1 cm. thick; spores white, smooth, oblong-elliptical or fusoid, 4.2-5.7 x 10-14 μ , often once to several times guttulate.

Growing on old logs in July and August. Frequent.

The above description is drawn from notes and specimens from two collections made at Oxford, Ohio, one in August, 1910, and the other in July, 1911. The odor of the fresh plant is described by the author as "nitrous". The large angular pores ally the species with *P. arcularius* Batsch. ex Fries and with *Favolus canadensis* Klotzsch. From the former it is easily separated by the much larger spores and from the latter by

the well developed stipe with the decurrent tubes, the usually umbilicate pileus, and the friable context when dry. Possibly it should be referred to *P. Rostkowii* Fr. or to *P. pallidus* Schulz. & Kalchbr., both of which some regard as being small scaleless forms of *P. squamosus* Huds. ex Fries. The spores agree well with those of *P. squamosus*, but although it can be shown to be related to that species, it is worthy of a distinct name.

33. *P. squamosus* Huds. ex Fries, Syst. Myc. 1: 343. 1821.

Boletus squamosus Huds. Fl. Angl. 626. 1798. [2nd ed.]

Pileus short-stipitate or almost sessile, dimidiate to reniform in outline, 6–25 cm. in diameter, 0.5–4 cm. thick, fleshy when fresh, firm and rigid when dry, whitish to dingy yellowish or brownish, clothed, especially toward the center, with large, appressed, brownish scales often concentrically arranged, azonate, margin thin and acute; context white, tough, soft-corky when dry, 0.5–3.5 cm. thick; tubes 2–8 mm. long, decurrent, the mouths white or yellowish, large and angular, 1–2.5 mm. in diameter; stipe lateral, often rudimentary, black at the base, reticulate above by the decurrent pores, 1–5 cm. long, 1 cm. or more thick.

Growing on injured or diseased deciduous trees. Rare.

Lloyd gives the spores as “oblong, 5–6 x 12–15 μ , hyaline, smooth.” Easily recognized by the large pores and the large, appressed, brownish scales. The plant is well illustrated by Bresadola (Fung. Trident. pl. 133), Freeman (Minn. Pl. Diseases. f. 125), Lloyd (Photograph. pl. 5), and Hard (Mushrooms f. 325).

34. *P. picipes* Fries, Syst. Myc. 1: 353. 1821.

P. fissus Berk. Hooker's Lond. Jour. Bot. 6: 318. 1847.

Pileus stipitate, circular to reniform in outline, convex or plane, when older usually becoming depressed or somewhat infundibuliform, 4–20 cm. broad, 0.1–0.8 cm. thick, tough and leathery when fresh, very rigid and brittle when dry, sometimes yellowish brown but usually dark chestnut-brown to reddish brown, usually lighter in color towards the margin, azonate, margin very thin, usually wavy and often lobed; context white to somewhat ochraceous, leathery when fresh, firm when dry, 1–7 mm. thick; tubes not more than 2 mm. long, decurrent on

the stipe, the mouths white to brownish in color, circular to angular, very minute, invisible to the unaided eye, averaging 5-7 to a mm.; stipe central to lateral, dark brown or black on the lower half, glabrous, 1-6 cm. long, 0.4-1.5 cm. thick.

On stumps and logs late in autumn. Common.

The combination of black stipe base and minute pores characterizes this and the next species. The two are separated mainly on point of size. Murrill describes this plant under the name of *P. fissus* Berk., which was originally described from specimens collected in Ohio. Patouillard (Tab. Fung. No. 136) says the spores are ovoid. Lloyd now considers this plant to be a form of *P. varius* Fries, of Europe. A good illustration of our plant will be found in Hard, Mushrooms f. 319.

35. *P. elegans* Bull. ex Fries, Epicr. Syst. Myc. 440. 1838.
Boletus elegans Bull. Herb. Fr. pl. 46. 1780.

Pileus stipitate, circular to reniform in outline, convexo-plane or depressed, 1.5-7 cm. in diameter, 0.2-1 cm. thick, leathery when fresh, rigid and firm when dry, pale ochraceous to dull orange-color, pruinose to glabrous, azonate, the margin rather thin, often radiate-striate, even or undulate; context white to light ochraceous, tough when fresh, soft corky when dry, 1-6 mm. thick; tubes 1-3 mm. long, decurrent on the stipe, the mouth whitish to pallid, circular to angular, averaging 4-5 to a mm.; stipe central, excentric or lateral, slender, black at the base, light colored above, pruinose or glabrous, 1-8 cm. long, 0.2-0.6 cm. thick.

On dead wood late in autumn. Not common.

Spores were not obtained from the writer's specimens. Murrill gives them as "oblong, smooth, hyaline, 7-8 x 3-3.5 μ ." The species is closely related to *P. picipes* Fries but is separated from it by the smaller size and the uniform ochraceous color of the pileus that never takes on the darker chestnut shades assumed by *P. picipes*. Bulliard (Herb. Fr. pl. 124) gives an excellent illustration of the plant under the name of *Boletus nummularius* Bull.

36. *P. radicans* Schw. Trans. Am. Phil. Soc. II. 4: 155. 1832.

P. Morgani Peck, Ann. Rept. N. Y. State Mus. 32: 34. 1879.

Pileus stipitate, circular in outline, 3.5-20 cm. broad, 0.3-0.8

cm. thick, fleshy or fleshy-tough when fresh, more or less friable when dry, yellowish brown or darker, finely tomentose or fibrillose-scaly, often becoming glabrous, azonate; margin thin and acute, often involute on drying; context white or light yellowish, soft and spongy, 2–6 mm. thick; tubes 1–5 mm. long, decurrent on the stipe, the mouths white or brownish on drying, circular to angular and irregular, averaging 2–3 to a mm.; stipe central, simple or rarely branching once or twice, yellowish or brownish, prolonged below into a long, black, rooting base, velvety or rough-squamulose above, 6–15 cm. long, 0.5 to 2 cm. thick; spores white, smooth, ovoid-elliptical, 6–8 x 12–15 μ .

Growing on the ground, sometimes around stumps, and probably attached to buried wood. Common.

This plant is always easily recognized by the black and radiating base of the stem. The type specimens of *P. Morgani* Peck were collected in Ohio by Morgan. For illustrations see Hard, Mushrooms f. 329., Lloyd, Syn. Sec. Ovinus f. 508; Syn. Stip. Polyp. f. 465., and Ohio Myc. Bull. 11: f. 46.

37. *P. flavovirens* Berk. & Curt. Grev. 1: 38. 1872.

Pileus stipitate, circular to irregular in outline, 4–10 cm. broad, 0.3–0.8 cm. thick, soft and fleshy when fresh, rigid but friable when dry, yellowish green or yellowish brown in color, the surface often cracked and areolate and the flesh showing yellowish in the cracks, slightly tomentose or glabrous, azonate, the margin thin and acute; context white or yellow, fleshy when fresh, soft and friable when dry, 1–4 mm. thick; tubes 1–5 mm. long, decurrent on the stipe, the mouths white or yellowish, sometimes reddish on drying, circular to angular, averaging 1–3 to a mm.; stipe simple or branched, usually excentric but sometimes central, often irregular in form, whitish or yellowish in color, 3–6 cm. long, 1–1.5 cm. thick; spores white, smooth, globose, or subglobose, 3–4.7 μ in diameter.

Growing on the ground in deciduous woods. Frequent in July and August.

A species easily recognized by the color of the pileus. The plant is fairly well represented by Hard (Mushrooms f. 327), and by Lloyd (Syn. Sect. Ovinus f. 501). According to Lloyd *P. cristatus* Pers. of Europe is not different from our plant. Murrill lists it under the name of *Grifola poripes* Fries ex Murr.

38. P. umbellatus Pers. ex Fries, Syst. Myc. 1: 354. 1821.

Boletus umbellatus Pers. Syn. Fung. 519. 1801.

Plants stipitate, 7–20 cm. in diameter, the stipe branching repeatedly and giving rise to many centrally attached pileoli which are circular in outline, 1–4 cm. broad, less than 5 mm. thick, fleshy in texture when fresh, rigid when dry, whitish to smoky brown in color, fibrillose or glabrous, azonate; margin thin, acute, entire; context white, fleshy or fleshy-tough, rather brittle when dry, usually not more than 1 mm. thick; tubes less than 2 mm. long, decurrent on the stipe branches, the mouths white, angular, averaging 2–4 to a mm.; stipe compound, the branches cylindrical in form, central or subcentral, white, usually entirely covered with the decurrent tubes; spores white, oblong-elliptic, smooth, $2.3\text{--}3.5 \times 7\text{--}9.4 \mu$.

Growing about the bases of stumps or trees, especially of *Quercus*. Rare.

Easily distinguished from its allies by the more regular and cylindrical stipe branches, the small and centrally attached pilei which are more or less circular in outline, and by the oblong-elliptic spores. Murrill describes it as *Grifola ramosissima* Scop. ex Murr. The plant is well illustrated by Lloyd (Syn. Stip. Polyp. f. 450), Hard (Mushrooms f. 320), and Atkinson (Mushrooms f. 183).

39. P. frondosus Dicks. ex Fries, Syst. Myc. 1: 355. 1821.

Boletus frondosus Dickson, Fasc. Pl. Crypt. Brit. 1: 18. 1785.

Plant stipitate, the stipe many times branching and giving rise to numerous overlapping pileoli, the whole plant forming a more or less globose mass often as much as 40 cm. in diameter; pileoli flabelliform or spatulate in outline, 2–7 cm. broad, 2–5 mm. thick, fleshy-tough when fresh, rigid when dry, grayish to mouse-colored, glabrous or minutely tomentose, azonate, the margin thin and acute; context white or whitish, fleshy-tough when fresh, fragile when dry, not more than 2 mm. thick; tubes 2–3 mm. long, decurrent on the stipe, the mouths white, angular or irregular, averaging 1–3 to a mm.; stipe compound, short and thick; spores white, smooth, ovoid to elliptical, $4.5\text{--}6 \times 6\text{--}9 \mu$.

Usually found at the bases of trees or stumps, preferably of *Quercus* and *Ulmus*. Common in late fall.

From *P. Berkeleyi* Fries and *P. giganteus* Fries this species is separated by the numerous small pileoli which in those species are large and few in number. The irregular stipe-branches and the more spathulate pileoli separate it from *P. umbellatus* Fries in which the stipe branches are cylindrical and the pileoli centrally attached and consequently more nearly circular in outline. The plant is illustrated in Atkinson, Mushrooms f. 181-82., Hard, Mushrooms f. 321., and McIlvaine, Am. Fungi pl. 128.

40. *P. giganteus* Pers. ex Fries, Syst. Myc. 1: 356. 1821.

Boletus giganteus Pers. Syn. Fung. 521. 1801. *Grifola Sumstinei* Murrill, Bull. Torr. Club 31: 335. 1904.

Plants composed of a few broad pileoli, 6-15 cm. in diameter and less than 0.5 cm. thick, dimidiate to flabelliform or spathulate in outline, fleshy-fibrous when fresh, more rigid when dry, grayish to brown, often black when dried—especially on the margin—, usually somewhat tomentose or fibrillose, azonate or subzonate, margin very thin and acute, often lobed, involute on drying; context white, fibrous, tough, 1-3 mm. thick; tubes 1-3 mm. long, at first white but blackish where bruised and on drying, the mouth angular to irregular, often torn, averaging 5-7 to a mm.; stipe short and thick; spores white, smooth, globose, 4-6 μ broad.

Growing on the ground around stumps. Frequent.

Separated from *P. Berkeleyi* Fries by the smooth spores; from *P. umbellatus* Pers. ex Fries, and *P. frondosus* Fries, by the much larger and fewer pileoli, and distinct from all of these in the blackening of the margin or of the entire pileus and hymenium when bruised or in drying. In the 'North American Flora' it is described under the name of *Grifola Sumstinei* Murr. In this country it has always been held to be the same as the European plant *P. giganteus* Fries, and European specimens recently received from Bresadola confirm this view. A very good illustration will be found in Bresadola, Fungi Tridenti pl. 134., and in Boudier, Ic. Myc. 1: pl. 153. To the writer's knowledge it has not been illustrated in American mycology.

41. *P. Berkeleyi* Fries, Nov. Sym. 40. 1851.

P. anax Berk. Grev. 12: 37. 1882.

Pileus stipitate, the stipe sometimes branching and giving

rise to from 2 to 4 pileoli, sometimes simple with but one large pileus; pileoli fleshy-tough when fresh, becoming rigid on drying, more or less circular in outline, 6–15 cm. broad, 0.3–1.5 cm. thick, light colored, whitish to yellowish, slightly tomentose or glabrous, azonate or obscurely zoned; margin rather thin, often lobed; context white, fleshy-tough, fragile when dry, 0.3–2 cm. thick; tubes 2–8 mm. long, decurrent on the stipe; mouths white or whitish, large and irregular, averaging 0.5–2 mm. in diameter; stipe short and thick, more or less tubercular, whitish in color, 4–7 cm. long, 3–5 cm. thick; spores white, minutely echinulate, globose, 5.6–8.4 μ in diameter.

Growing at the bases of trees and stumps, especially of *Quercus*. Frequent.

This is one of the largest of our species and is easily distinguished from all of its allies by the echinulate spores. Morgan's description of *P. anax* Berk. applies to *P. frondosus* Fries and not to *P. Berkeleyi* for which *P. anax* is a synonym. (See Lloyd, Mycological Notes 27: 341–342.) The plant is well represented by the following illustrations: Lloyd, Photogr. pl. 9–10; Myc. Notes Polyp. Iss. 3: f. 362–63., and Hard, Mushrooms f. 323 and pl. 45.

42. *P. sulphureus* Bull. ex Fries, Syst. Myc. 1: 357. 1821.

Boletus sulphureus Bull. Herb. Fr. pl. 429. 1788. *P. cincinnatus* Morgan, Jour. Cinc. Soc. Nat. Hist. 8: 97. 1885.

Plants annual, often attenuate at the base and appearing substipitate, imbricate; pileus dimidiate to flabelliform in outline, 5–20 x 4–12 x 0.5–2.5 cm., fleshy and watery when young, becoming firm when old, yellowish to bright orange-colored, sometimes fading with age, finely tomentose to glabrous, azonate or with broad colored zones, the margin thin and acute, sometimes lobed; context white or light yellow, fleshy when fresh, rather soft and friable when dry, 0.4–2 cm. thick; tubes 1–4 mm. long, the mouths bright sulphur-yellow, sometimes whitish or dull yellow with age or on drying, angular, averaging 2–4 to a mm.; spores white, smooth, ovoid to subglobose, 4–5 x 5.5–7 μ .

Growing on trunks and stumps of deciduous trees. Common.

Specimens usually change color on drying and most of the red color of the pileus is lost. The bright yellow of the hyme-

nium may or may not persist. The best colored representation of the fungus is that given by Rostkowius in Sturm, Deutschl. Flora 4: pl. 20. The plant is widely distributed and well known and has figured largely in American mycology. The following illustrations will aid in determinations: Atkinson, Mushrooms f. 184-85., Duggar, Fung. Dis. Pl. f. 226., Hard, Mushrooms f. 326., and von Schrenk, U. S. Dept. Agr., Div. Veg. Path. Bul. 25: pl. 11. f. 1-4.

43. *P. Pilotae* Schw. Trans. Am. Phil. Soc. II. 4: 157. 1832.

P. hypococcineus Berk. Lond. Jour. Bot. 6:319. 1847.

Plants annual, sessile; pileus dimidiate, often subungulate, 5-12 x 6-15 x 1-5 cm., soft coriaceous or corky, buff or orange-colored, becoming whitish on drying, minutely tomentose or glabrous, azonate, margin usually obtuse; context pale buff, becoming carneous when dry, fibrous, sometimes very hard when dry, strongly zonate, 0.7-2 cm. thick; tubes 0.5-2 cm. long, the mouths orange-colored, becoming brownish on drying, angular, averaging 3-5 to a mm.; spores (teste Murrill) smooth, hyaline, 3-4 x 2-3 μ .

On dead wood of *Quercus* and *Castanea*. Rare.

Easily distinguished from other species with a predominance of red or orange colors by the thick pileus and the long tubes. The plant is said to emit a strong odor when growing. The type specimens of *P. hypococcineus* Berk. were collected in Ohio by Lea. *P. castanophilus* Atk., described from North Carolina, is said to be the same plant.

44. *P. sanguineus* L. ex Fries, Syst. Myc. 1: 371. 1821.

Boletus sanguineus L. Sp. Plant. 1646. 1762. [2nd ed.]

Plants annual, sessile; pileus dimidiate to flabelliform, 2-5 x 2-8 x 0.2-0.5 cm., coriaceous, bright red, finely tomentose to glabrous, often zonate, the margin very thin and acute; context red or yellowish red, soft and floccose, scarcely more than 2 mm. thick; tubes 0.5-1.5 mm. long, the mouths red, more or less angular or circular when young, averaging 2-4 to a mm.; pileus often attached by an attenuate base and then appearing substipitate.

On dead wood of deciduous trees. September to December. Rare.

The species is distinguished from the following one by the much thinner pileus and the marked tendency to appear sub-stipitate. Otherwise it scarcely differs, and intermediate forms are found that are difficult to place satisfactorily. It is usually considered to be a southern species, but Hard reports finding it in Ohio. His specimens were determined by Peck.

45. *P. cinnabarinus* Jacq. ex Fries, Syst. Myc. 1: 371. 1821.

Boletus cinnabarinus Jacq. Fl. Austr. 4: 2. 1776.

Plants annual, rarely reviving, sessile or effused-reflexed; pileus dimidiate or reniform, 2–6 x 2–10 x 0.5–2 cm., tough and leathery when fresh, more rigid when dry, orange-colored to cinnabar-red, often becoming paler or almost white with age, compactly tomentose or glabrous, usually azonate, margin thin or thick, acute; context red or yellowish red, floccose-fibrous to soft-corky, always zonate, 0.4–1.5 cm. thick; tubes 1–4 mm. long, the mouths cinnabar-red, circular then angular and sometimes somewhat sinuous, averaging 2–4 to a mm.; spores white, smooth, oblong, 2–2.5 x 4.5–5.5 μ .

On dead wood of all kinds. September to December. Common.

The prevailing deep red color of both pileus and hymenium separates this species from all others of the genus except *P. sanguineus* Fries, from which this species differs only in being thicker and in having the context more strongly zoned. *P. cinnabarinus* is a northern species and much more common in Ohio than is *P. sanguineus*.

46. *P. resinosus* Schrad. ex Fries, Syst. Myc. 1: 361. 1821.

Boletus resinosus Schrad. Spic. Fl. Ger. 171. 1794.

Plants annual, sessile or decurrent, more or less imbricate; pileus dimidiate, 5–15 x 7–25 x 0.8–2.5 cm., somewhat fleshy and full of water when young, firmer when mature and soft-corky on drying, velvety-tomentose to glabrous, sulcate or with a few broad, colored zones, margin at first thick and somewhat obtuse, becoming thinner and acute; context pallid to light brown, fleshy and watery when young, soft-corky when dry, 0.5–2 cm. thick; tubes 1–6 mm. long, the mouths white to pallid, changing to a darker color on drying, circular to angular, averaging 4–6 to a mm.; spores white, smooth, cylindrical, curved, 1.2–2 x 5–6.3 μ .

On old logs and stumps in October and November. Common.

Distinguished by the brown pileus and the light brown, almost whitish context. For illustration see Hard, Mushrooms *f.* 331.

47. *P. nidulans* Fries, Syst. Myc. 1: 362. 1821.

Plants sessile or effused-reflexed; pileus dimidiate, 1.5–6 x 2–8 x 0.5–2 cm., very soft, spongy, and full of water when fresh, firm and friable when dry, umber to cinnamon or tawny brown, finely villous-tomentose to glabrous, azonate, margin thin and acute, purplish or reddish where bruised; context concolorous with the pileus, sometimes with a darker layer next to the hymenium, soft and watery when fresh, cheesy and friable when dry, 2–8 mm. thick; tubes 2–7 mm. long, mouths hoary when young, yellowish or reddish brown when mature, angular or sinuous, averaging 3–4 to a mm.; spores white, smooth, globose or subglobose, 2–3.5 μ in diameter.

On dead wood of deciduous trees, especially *Quercus*. June to September. Not common.

Distinguished by the uniform umber brown color of the whole plant, the soft and watery context, etc.

48. *P. gilvus* Schw. ex Fries, Elench. Fung. 1: 104. 1828.

Boletus gilvus Schw. Syn. Fung. Car. 96. 1822.

Plants annual or reviving for two or three years, sessile or effused-reflexed, often imbricate; pileus dimidiate, 1–7 x 2–12 x 0.2–2 cm., leathery or corky when fresh, woody and rigid when dry, yellowish brown or reddish brown, in very young stages covered by a purplish, villous pubescence, otherwise glabrous, usually rough, more or less zonate, margin thin and acute; context yellowish brown, soft-corky to woody, 0.1–1.3 cm. thick; tubes 1–5 mm. long, the mouths reddish brown or darker, circular, then angular, averaging 6–8 to a mm., the walls rather thick and entire; spores white, smooth, oblong-ellipsoid, 3–4 x 5–6 μ .

On dead wood of all kinds. July to December. Common.

Closely related to *P. radiatus* Sow. ex Fries and *P. cuticularis* Bull. ex Fries, but distinct in the white spores, the lighter colored surface and the more woody context. *P. isidiodes* Schw. as reported by Lea belongs here.

49. *P. radiatus* Sow. ex Fries, Syst. Myc. 1: 369. 1821.

Boletus radiatus Sow. Eng. Fungi pl. 196. 1799.

Plants annual, sessile or decurrent; pileus dimidiate or flabelliform and attached by an attenuate base, 2-5 x 2-7 x 0.3-2 cm., firm and rigid, yellowish brown or rust-colored, velvety to glabrous, sometimes conspicuously zonate, sometimes azonate, margin thin or thick, acute; context yellowish to rusty brown, corky and somewhat friable, 2-5 mm. thick; tubes 1-8 mm. long, the mouths grayish umber to rusty red, circular, then angular, averaging 4-5 to a mm.; spores (teste Bresadola) yellowish, elliptical, 3.5-4.5 x 5.5-6.5 μ .

Growing commonly on *Betula* and *Alnus*. Rare.

A species intermediate between *P. gilvus* Schw. ex Fries, and *P. cuticularis* Bull. ex Fries, distinguished from the former by the habitat, the brighter color and the smoother surface of the pileus, and by the colored spores, and from the latter chiefly in the habitat. The species was reported from Ohio by Lea but I have not examined the plants.

50. *P. cuticularis* Bull. ex Fries, Syst. Myc. 1: 363. 1821.

Boletus cuticularis Bull. Herb. Fr. pl. 462. 1809.

Plants annual, sessile, often imbricate; pileus dimidiate or flabelliform and attached by an attenuate base, 3-7 x 3.5-10 x 0.3-1 cm., spongy and fleshy-tough when fresh, leathery to rigid when dry, yellowish brown to rusty brown, compact wooly-tomentose, becoming fibrillose or almost glabrous, sometimes subzonate on the margin, margin thin, acute, often inflexed; context yellowish brown or rust-colored, tough and watery when fresh, distinctly fibrous, 2-7 mm. thick; tubes 2-7 mm. long, the mouths hoary brown to rust-colored, angular, averaging 3-5 to a mm.; spores yellowish brown, smooth, subglobose to broadly elliptical, 4.2-5.7 x 5.5-7 μ .

On dead wood of deciduous trees. August to November. Common.

This species is very closely related to *P. radiatus* Sow. ex Fries, but Ohio plants may be distinguished from that species by the habitat, the thicker and larger pileus, and by the more tomentose and spongy surface. *P. perplexus* Peck, the types of which have been destroyed, is thought by some to be this species and our plants are frequently referred to it.

51. *P. hispidus* Bull. ex Fries, Syst. Myc. 1:362. 1821.

Boletus hispidus Bull. Herb. Fr. pl. 210. 1791. *Polyporus endocrocinus* Berk. Hooker's Lond. Jour. Bot. 6:320. 1847.

Plants annual, sessile, sometimes imbricate; pileus dimidiate, 6–20 x 9–25 x 2–6 cm., spongy and watery when fresh, firm and rigid when dry, yellowish brown to rusty red, soft from the covering of the dense hirsute or hispid tomentum or pubescence, azonate, margin thick or thin, obtuse or acute; context usually light yellowish brown above and dark reddish brown next to the hymenium, fibrous, firm when dry, 1–5 cm. thick; tubes 0.6–1.5 cm. long, mouths yellowish brown becoming darker where bruised, circular, then angular, averaging 2–4 to a mm.; spores yellowish brown, smooth, broadly ovoid to ellipsoid, 6.5–7 x 7–9.5 μ .

On living trunks of deciduous trees. September to December. Rare.

Much larger than *P. cuticularis* Bull. ex Fries, and *P. radiatus* Sow. ex Fries, and especially distinct by the hirsute or hispid pubescence. In point of size it more nearly approaches *P. dryadeus* Pers. ex Fries, and *P. dryophilus* Berk., but easily distinguished from them by the pubescence.

52. *P. dryadeus* Pers. ex Fries, Syst. Myc. 1: 374. 1821.

Boletus dryadeus Pers. Obs. Myc. 3. 1799.

Plants sessile; pileus dimidiate, applanate, 6–30 x 8–35 x 2–6 cm., spongy and watery when fresh, more or less corky or woody when dry, grayish brown to dark brown or black in old specimens, glabrous, azonate, margin thick and obtuse, distilling drops of water when young and growing; context umber-brown to rust-colored, subshining when dry, soft and watery, corky or woody on drying, 1.5–4 cm. thick; tubes 0.3–2 cm. long, mouths grayish brown, darker on drying, circular, then angular, averaging 3–5 to a mm.; spores (teste Bresadola) globose or subangular, smooth, yellowish, 8–9 x 7–8 μ .

On living trunks of *Quercus*. September to November. Rare.

Very closely related to *P. dryophilus* Berk., and probably the two have been confused in this country. *P. dryadeus* is usually considered to be a more applanate form and much larger than *P. dryophilus*. There is also said to be a decided difference

in spore color in the two plants, *P. dryadeus* having much paler spores than *P. dryophilus*, but for this I cannot vouch. So far as known, *P. dryadeus* has not been collected in Ohio but the species has been reported from Michigan and Kentucky. Lloyd (Myc. Notes 36. f. 383) gives an illustration.

53. *P. dryophilus* Berk. Hooker's Lond. Jour. Bot. 6:321. 1847.

Plants annual, sessile; pileus dimidiate, often unguulate, 3–12 x 7–20 x 1–10 cm., rather rigid, grayish brown, to reddish brown, scabrous with an innate, ferruginous pubescence, azonate or subzonate, margin thick and obtuse; context cinnamon or rusty brown, subshining, corky to hard and woody; tubes 0.3–2.5 cm. long, ferruginous-yellow within, the mouths cinnamon-brown, angular, averaging 2–3 to a mm.; spores ferruginous, smooth, ellipsoid to subglobose, 5 x 6.5 μ .

On living *Quercus* and on logs. August to November. Rare.

This species was originally described from specimens collected at Waynesville, Ohio, by Lea. To the description as given in Lea's catalogue the following note was added: "Nearly allied to *Polyporus dryadeus*, but a smaller, more rigid species with larger, differently colored pores. It has also much resemblance to *P. gilvus*."

54. *P. Schweinitzii* Fries, Syst. Myc. 1:351. 1821.

Plants stipitate or sessile; pileus circular to dimidiate, 5–15 cm. broad, 0.5–1.5 cm. thick, spongy to soft-corky when fresh, firm, rigid, and sometimes friable when dry, ochraceous to orange-colored or brown in mature specimens, strigose-tomentose to almost glabrous, usually more or less zonate, margin thin or thick, acute; context yellowish to reddish brown, spongy when fresh, usually friable when dry, 0.2–1 cm. thick; tubes 1–6 mm. long, the mouths yellowish, darker when bruised and sometimes dark brown on drying, circular to angular and soon irregular, averaging 1–3 to a mm.; stipe present and well developed or entirely absent, central or excentric, agreeing in color, pubescence and consistency with the pileus, 0–6 cm. long, 1–2 cm. thick; spores (teste Lloyd) white, elliptical, smooth, 4 x 6 μ .

Growing on or about *Pinus*. Autumn. Rare.

This species is a very variable one, yet quite distinct in habi-

tat, consistency, pubescence, color, etc. It is known in Ohio only from a collection made at Cincinnati (now in the Lloyd Museum) by Mr. Wm. Holden. For illustrations see Lloyd, Myc. Notes, Polyp. Issue 1: f. 208., and von Schrenk, U. S. Dept. Agr., Div. Veg. Path. Bul. 25: pl. 1. f. 1., pl. 2.

55. *P. circinatus* Fries, Monogr. Hymen. Suec. 2:268. 1863.

Pileus stipitate or substipitate, circular to spatulate or flabelliform, convex to depressed, 3–9 cm. broad, 0.3–1 cm. thick, rather soft when fresh, firm when dry, yellowish to umber-brown, tomentose to velvety, azonate or subzonate, margin rather thin, acute; context yellowish to cinnamon-brown, duplex, soft and spongy above, firm next to the tubes, 1–6 mm. thick; tubes 1.5–4 mm. long, the mouths whitish to cinnamon, subcircular to angular, averaging 2–4 to a mm.; stipe sometimes rudimentary, usually lateral or excentric, fulvous to dark brown, tomentose, soft, up to 5 cm. long, 0.5–1.5 cm. thick; spores (teste Lloyd) pale color, $3 \times 5 \mu$.

In coniferous and deciduous woods.

The species has not been reported from Ohio. It is distinguished by the duplex character of the context and by the poor development of a stipe. It is a question whether it is distinct from *P. tomentosus* Fr. Certainly *P. dualis* Peck is the same plant. Lloyd regards American plants in which the context is always duplex as belonging under *P. circinatus* Fries, and European plants with a uniform context as *P. tomentosus* Fries. The plant is illustrated by Lloyd (Myc. Notes Polyp. Issue f. 198–99).

56. *P. obesus* (Ellis & Ev.) Overholts, n. comb.

Polystictus obesus Ellis & Ev. Bull. Torr. Bot. Club 24:125. 1897.

Stipitate. Stipe central, spongy, velutinous, dark cinnamon, 4–6 cm. high, 0.5–1.5 cm. thick above, enlarged below to 1–3 cm.; pileus convex then depressed in the center, obconical at first with the margin obtuse, then spreading out with the margin acute, color lighter than that of the stipe, yellowish cinnamon, surface uneven, subcolliculose, not zonate, 4–6 cm. across; pores irregular, short (1 mm.), at first round with margins thick, finally irregular and subsinuous, 0.5–1 mm. across, margins acute; spores elliptical, ferruginous, $7-8 \times 4-5 \mu$.

On the ground, in contact with and partly attached to decaying pine limbs partly buried in the soil. (The above description is according to Ellis and Everhardt, Bull. Torr. Bot. Club. **24**: 125. 1897.)

Distinguished from the next three species by the greater thickness of the pileus and stipe. From *P. circinatus* Fries, it is separated by the absence of a duplex context and by the slightly smaller pores. The plant is recorded by Morgan as *P. Montagnei* Fries, but according to Lloyd the record is based on plants collected in Canada by Dearness. It is listed in Lea's catalogue under the same name.

57. *P. focicola* Berk. & Curt. Jour. Linn. Soc. Bot. **10**: 305. 1868.

Pileus stipitate, circular in outline, convex-depressed to umbilicate, 2–4 cm. broad, 1–6 mm. thick, coriaceous when fresh, rigid when dry, grayish brown to cinnamon, finely tomentose, striate, zonate, margin thin and acute; context cinnamon-brown, fibrous, less than 0.5 mm. thick; tubes 1–6 mm. long, the mouths angular or irregular, cinnamon to rusty brown, averaging 1 mm. or more in diameter; stipe central, light to dark brown, minutely velvety, 1.5–3 cm. long, 2–4 mm. thick; spores (teste Lloyd) pale colored, smooth, elliptical, $5 \times 10 \mu$.

On burned earth in woods. July to November. Rare.

The species differs from *P. perennis* L. ex Fries only in the much larger pores. The plants were reported by Lea as *P. connatus* Schw. and by Morgan as *P. parvulus* Klotzsch. The plant is well illustrated by Lloyd (Myc. Notes Polyp. Issue 1: f. 203–4).

58. *P. perennis* L. ex Fries, Syst. Myc. **1**: 350. 1821.

Boletus perennis L. Sp. Plant. 1177. 1753.

Pileus stipitate, circular in outline, convex-depressed to umbilicate, 1.5–7 cm. broad, 1–3 mm. thick, coriaceous, rigid when dry, grayish brown to cinnamon or rust-colored but never silky, finely tomentose, zonate, margin thin and acute; context cinnamon-brown, fibrous, less than 1 mm. thick; tubes 1–2.5 mm. long, the mouths grayish to cinnamon, angular, averaging 2–4 to a mm.; stipe central or subcentral, cylindrical, concolorous with the pileus, velvety, 1.5–5 cm. long, 1–6 mm. thick; spores (teste Lloyd) pale colored, $4\text{--}5 \times 8\text{--}10 \mu$.

Growing on burned earth. July to November. Not common.

The plant closely resembles the next species but is separated from it by the habitat and the dull cinnamon or cinnamon-gray color of the zonate pileus. *Polystictus proliferus* Lloyd is said by its author to be a form of this species. It was collected near Cleveland. This species is illustrated by Atkinson (Mushrooms f. 187), Hard (Mushrooms f. 346), and Lloyd (Myc. Notes Polyp. Issue 1: f. 201).

59. *P. cinnamomeus* Jacq. ex. Fries, Epier. Syst. Myc. 429. 1838.

Boletus cinnamomeus Jacq. Coll. Bot. etc. 1: 116. 1786.
P. subsericeus Peck, Ann. Rept. N. Y. State Mus. 33: 37. 1880.

Pileus stipitate, circular in outline, convex-depressed to umbilicate, 1–5 cm. broad, 1–3 mm. thick, pliant and tough, bright cinnamon-rufous to bright amber-brown, silky fibrillose, the fibrils sometimes suberect towards the center of the pileus, silky striate, sometimes zonate, margin thin and acute; context cinnamon or rusty brown, fibrous, less than 0.5 mm. thick; tubes not more than 2 mm. long, the mouths rufous-cinnamon, angular, averaging 2–4 to a mm.; stipe central, cylindrical, concolorous with the pileus, velvety to villous, 1–4 cm. long, 1–3 mm. thick; spores (teste Lloyd) pale colored, elliptical, smooth, 5–6 x 7–10 μ .

Most frequently on clay banks, usually among moss. July to September. Not common.

Distinguished from *P. circinatus* Fries, and *P. obesus* Ellis & Ev. by the very thin context; from *P. perennis* L. ex Fries by the silky pileus and the habitat; from *P. focicola* Berk. & Curt. by the much smaller pores. For illustrations see Lloyd, Myc. Notes Polyp. Issue 1: f. 200., and Bresadola, Fungi Trid. pl. 99.

60. *P. lucidus* Leyss. ex Fries, Syst. Myc. 1: 353. 1821.

Boletus lucidus Leyss. Flora Halensis 300. 1783. [2nd ed.] *Ganoderma sessile* Murr. Bull. Torr. Bot. Club 29: 604. 1902. *Ganoderma subperforatum* Atk. Bot. Gaz. 46: 337. 1908.

Plants stipitate or sessile, annual; pileus dimidiate or reniform in outline, 3–12 x 3.5–20 x 0.4–2.5 cm., coriaceous-corky when fresh, corky or woody when dry, the upper surface covered by an encrusting persistent layer of deep reddish chestnut var-

ish, often wrinkled, glabrous or pruinose from a coating of brown conidial (?) spores, zonate or concentrically sulcate, the margin thin and acute, sometimes lobed; context whitish to light brown, sometimes separated into an upper, light colored, soft layer, and a lower darker and firmer layer, but often uniform in color and texture, 0.2–1.5 cm. thick; tubes 0.3–1.5 cm. long, not decurrent, the mouths white or umber, darker when bruised, circular to angular, averaging 3–5 to a mm.; the hymenium often with red-varnished patches on which no tubes are produced; stipe often entirely absent, lateral when present, covered like the pileus, 1–10 cm. long, 0.5–1 cm. thick; spores yellowish brown, smooth or apparently slightly verrucose, ovoid with a truncate base, 5–6.3 x 9.4–11 μ .

On stumps and trunks of dead or injured deciduous trees. Common.

The variation in the pileus from stipitate to sessile may be confusing at first, but the deep chestnut-red color, not changing to yellowish as in the next species, will usually be found to be the distinguishing character of the species. The plant is described by Murrill under the name of *Ganoderma sessile* Murr. Atkinson has described a new species of *Ganoderma* from Ohio under the name of *G. subperforatum*. At the writer's request Professor Atkinson very kindly sent the type collection for examination. Under the ordinary high power of the microscope the spores of both *P. lucidus* and *G. subperforatum* appear to be practically smooth. By the use of the oil-immersion lens varying degrees of apparent echinulation are to be made out in the ordinary forms of *P. lucidus* while in the type collection of *G. subperforatum* the spores do not have that appearance, although Professor Atkinson states that by first boiling the spores in potassium hydroxide solution the perforations in the spore walls are faintly visible. I am convinced, however, that the echinulate appearance when present is not due to projections on the outer wall, but, as Atkinson has said, to perforations in the inner spore wall. An examination of the dozen or more collections of *P. lucidus* in my own herbarium have given evidence of a great variability in this character. Since *G. subperforatum* is not otherwise to be distinguished from *P. lucidus*, it has seemed best to consider the name as a synonym in this paper. Even

were the character constant one might well question the advisability of separating the species on a character that requires the use of the oil-immersion lens for its detection.

This and the following species are included in the genus *Fomes* by Saccardo, and many writers have followed his example. Why this should be done is not clear, for both species are always annual and the tubes are never stratified. The following illustrations will aid in determination: Atkinson, Mushrooms *f.* 188; Bot. Gaz. 46: *f.* 5., and Hard, Mushrooms *f.* 332.

61. *P. Curtisii* Berk. Hooker's Jour. Bot. Kew Gard. Misc. 1: 101. 1849.

Pileus stipitate, reniform or flabelliform in outline, 3–12 x 3–20 x 0.7–2 cm., coriaceous-corky when fresh, corky when dry, covered with a thin chestnut or reddish varnish that soon begins to disappear, leaving the pileus yellowish or sometimes almost white, glabrous, zonate or concentrically sulcate, the margin rather thick, sometimes truncate; context in two layers, a yellowish or pallid upper layer, rather soft in texture, and a brownish lower layer next to the hymenium, firm or corky in texture, the whole 0.5–1 cm. thick; tubes 0.3–1.2 cm. long, not at all decurrent, the mouths white to brownish, mostly circular, averaging 3–5 to a mm.; stipe always lateral, cylindrical, persistently red-varnished and encrusted, sometimes bluish in color, the context in two layers as in the pileus, 2–10 cm. long, 0.5–3 cm. thick; spores brown, ovoid to elliptic, smooth or appearing minutely echinulate, with a heavy outer wall, 4.6–7.2 x 8.5–11.8 μ .

On and about stumps and trunks of trees. Rare.

This is typically a more southern plant and is rarely found north of the Ohio River. It is distinguished from the preceding species by the yellowish color assumed by the mature pileus, the change in color being due to the disappearance of the reddish varnish. It is sometimes classed as a *Fomes* but is probably never truly perennial. For illustration see Atkinson, Bot. Gaz. 46: *f.* 1–3.

SPECIES DOUBTFUL OR EXCLUDED

The following species reported by either Morgan or Lea are now believed to have been misdetermined, but the writer does not know to what species the plants should be referred: *P. ovinus* Schaeff. ex Fries; *P. leucomelas* Pers. ex Fries; *P. lentus* Berk.; *P. fragilis* Fries; and *P. badius* Schw.

P. intybaceus Fries reported by Morgan is possibly a form of *P. giganteus*, *P. frondosus*, or a closely related species.

P. phæoxanthus Berk. was originally described from material collected in Ohio by Sullivant. The type specimen is said to be in fragments and the plant has never been collected since Sullivant's time.

FOMES Fries, ex Gill.

Champ. Fr. 682. 1878. Fries; Nov. Symb. 31. 1851.

Plants typically perennial, epixylous, sessile (in our species); pileus corky or more often woody in texture, often becoming rimose, anoderm, or encrusted; context white, reddish, or brownish, soft and punky to hard and woody; tubes as in *Polyporus* except that they are arranged in definite or indefinite layers corresponding to periods of growth of the plant, the mouths circular or angular, never dædaloid or irpiciform; spores white or brown.

The genus *Fomes* includes all of the perennial forms which have the tubes as in the genus *Polyporus*. Each season one layer of tubes is produced and plants of the first season's growth are likely to be referred to the genus *Polyporus*. The key to that genus has been made to include a few such forms, the descriptions of which are always to be sought in the genus *Fomes*. A few species are so constantly annual in duration that they might perhaps better be included in the genus *Polyporus*.

KEY TO THE SPECIES

- | | |
|---|---|
| Context white or only slightly colored (<i>Species with wood-colored, flesh-colored, or rose-colored context included here</i>) | 1 |
| Context yellowish brown or darker | 7 |
| 1. Sporophore small, scarcely more than 2 cm. broad; context white | 2 |
| 1. Sporophore larger, more than 2 cm. broad; context whitish or somewhat colored | 3 |

2. Pileus entirely dark brown or black; plants growing only on the wood of *Alnus* and *Hamamelis*.....1. *F. scutellatus*
2. Pileus not entirely black, the margin at least remaining white; plant growing on the wood of other deciduous trees, often on structural timber.....2. *F. ohiensis*
3. Hymenium or context pinkish or reddish.....4
3. Hymenium or context whitish or yellowish.....5
 4. Tubes more than 3 mm. long; plants usually growing on stumps and trunks of *Fraxinus*.....6. *F. fraxineus*
 4. Tubes not more than 3 mm. long; plants usually growing on the wood of coniferous trees.....7. *F. carneus*
5. Hymenium distinctly stratified, the strata of tubes separated by distinct layers of context; mouths of the tubes angular, usually glistening. .4. *F. connatus*
5. Hymenium indistinctly stratified or if somewhat distinctly so the layers not separated by distinct layers of context; mouths of the tubes mostly circular, not glistening.....6
 6. Plant growing on dead wood, usually of coniferous trees; mouths of the tubes small, averaging 3-5 to a mm.....5. *F. pinicola*
 6. Plant growing only on living *Fraxinus*; mouths of the tubes rather large, averaging 2 to a mm.....3. *F. fraxinophilus*
7. Pilei forming a densely imbricate, globose or cylindrical mass....8. *F. graveolens*
7. Pilei not forming a densely imbricate, globose or cylindrical mass.....8
 8. Surface of the pileus not distinctly encrusted.....9
 8. Surface of the pileus distinctly encrusted.....13
9. Context less than 5 mm. thick; sporophore often effused-reflexed or entirely resupinate; growing usually on dead wood.....9. *F. conchatus*
9. Context more than 5 mm. thick; sporophore generally sessile; often growing on living trees.....10
 10. Sporophore found only on *Robinia*.....11. *F. rimosus*
 10. Sporophore found on some other host.....11
11. Tubes in the older layers distinctly white encrusted or stuffed.....12
11. Tubes in the older layers not distinctly white encrusted or stuffed 12. *F. Everhartii*
 12. Surface of the pileus black, somewhat shining, and rimose; margin rather thin and acute.....13. *F. igniarius*
 12. Surface of the pileus dull brown; margin thick and somewhat obtuse....14. *F. nigricans*
13. Encrusting layer thin, easily indented; plants annual or sometimes reviving the second season but with the pileus distinct from and coming out below that of the first season.....17. *F. lobatus*
13. Encrusting layer thick and horny; plants strictly perennial.....14
 14. Plant growing only on species of *Prunus*.....10. *F. fulvus*
 14. Plant growing on some other host.....15
15. Context hard and woody.....13. *F. igniarius*
15. Context punky.....16
 16. Mouths of the tubes medium-sized, averaging 3 to a mm.; spores white.....15. *F. fomentarius*
 16. Mouths of the tubes minute, averaging 5 to a mm; spores brown.....16. *F. applanatus*

1. *F. scutellatus* Schw. ex Cooke, *Grevillea* 14: 19. 1885.
Polyporus scutellatus Schw. Trans. Am. Phil. Soc. II. 4: 157.
1832.

Plants perennial, sessile, often attached by the apex of the pileus; pileus dimidiate or circular, convex, 0.5–1.5 x 0.5–2 x 0.1–0.5 cm., corky when fresh, hard and woody when dry, dark brown or black at least when mature, velvety, azonate or somewhat concentrically sulcate, margin rather thick, acute; context white to wood-colored, corky, not more than 2 mm. thick; tubes 1–2 mm. long, indistinctly stratified, the mouths white to umber, circular or subcircular, averaging 4–5 to a mm.

Chiefly on dead limbs of *Alnus* and *Hamamelis*. Rare.

This species is distinguished from *F. ohioensis* Berk. ex Murrill by the habitat and the black surface of the entire pileus including the margin. Specimens have been received from Mr. Claassen, Cleveland, Ohio.

2. *F. ohioensis* Berk. ex Murrill, Bull. Torr. Bot. Club 30: 230. 1903.

Trametes ohioensis Berk. *Grevillea* 1: 66. 1872.

Plants perennial, sessile, often attached by the vertex of the pileus; pileus dimidiate or shield-shaped, convex to unguulate, 0.5–3 x 0.5–4 x 0.2–1 cm., soft-corky when fresh, hard and woody when dry, at first pure white but becoming cinereous or yellowish and often black at the base but the margin remaining white, finely tomentose to glabrous, often zonate or concentrically sulcate, margin rather thick, acute or obtuse; context white to wood-colored, soft-corky to woody, 1–3 mm. thick; tubes 1–5 mm. long, often arranged in more or less definite rows, indistinctly stratified in two to six layers, the mouths white, circular, averaging 3–5 to a mm., the dissepiments almost as thick as the diameter of the pores.

On dead wood of deciduous trees, especially on structural timber. Common.

By its small size this species is separated from all perennial forms except *F. scutellatus* Schw. ex Cooke. It differs from that species in habitat and in the margin of the pileus always remaining white.

3. *F. fraxinophilus* Peck ex Sacc. Syll. Fung. 6:172. 1888.

Polyporus fraxinophilus Peck, Ann. Rept. N. Y. State Mus. 35: 136. 1882.

Plants perennial, sessile or effused-reflexed, often imbricate; pileus dimidiate, convex to compressed-ungulate, 2–25 x 3.5–40 x 1.5–10 cm., woody, white at first, becoming blackish and often somewhat rimose with age, not encrusted, soon glabrous, concentrically sulcate, margin thick, obtuse or acute; context white to cinnamon wood-color, corky or woody, 0.5–1 cm. or more thick; tubes 2–3 mm. long, indistinctly stratified in many layers, the mouths white to cinereous or yellowish, circular, averaging 2–3 to a mm., the walls thick and entire; spores white, smooth, ellipsoid to ovoid or pyriform, 5–6.3 x 7.3–8 μ .

Growing only on living trunks of *Fraxinus*. Common.

In habitat the species corresponds closely to *F. fraxineus* Bull. ex Cooke, from which it differs in the entire absence of any rosy or reddish colors and in being always perennial. An excellent illustration is given by Hard (Mushrooms f. 350).

4. *F. connatus* Weinm. ex Gill. Champ. Fr. 1: 684. 1878.

Polyporus connatus Weinm. Fl. Ross. 332. 1836. *P. connatus* Fries, Epicr. Syst. Myc. 472. 1838.

Plants perennial, sessile or effused-reflexed, sometimes imbricate; pileus dimidiate, convex, 2–10 x 3–15 x 0.5–4 cm., corky when fresh, somewhat woody when dry, whitish, cinereous, or slightly yellowish, sometimes blackish toward the base, not encrusted, velvety-tomentose to glabrous, usually azonate, margin thick, acute or obtuse; context white or pallid, punky to soft corky, 0.3–1 cm. thick; tubes 1.5–5 mm. long, distinctly stratified, the different strata separated from each other by a thin layer of context, the mouths whitish to yellowish, glistening, angular, averaging 4–5 to a mm., the walls entire to slightly dentate; spores (teste Bresadola) white, globose, 3–4 μ in diameter.

Growing on living deciduous trees, more often at the bases of species of *Acer*, and frequently covered with moss. Common.

The distinguishing characters are the habitat, the layers of context interposed between successive layers of tubes, and the glistening mouths of the tubes. In but one other species of *Fomes* do we find the second character developed and that

is in *F. applanatus* Pers. ex Wallr. That species always grows on old logs and stumps and has a rusty brown context.

Bresadola and Murrill regard *F. populinus* Schum. ex Cooke, to be the same plant as this species. This may be the case but the figure of *F. connatus* in Fries' 'Icones' (f. 185) represents our plant much better than the figure of *F. populinus* in 'Flora Danica' (pl. 1791). Most of the specimens distributed in exsiccati in both this country and Europe are under the former name and that one is here given preference. A study of the types of both species should show whether they are the same or not, but from the evidence at hand our plants must be referred to *F. connatus*.

5. *F. pinicola* Sw. ex Cooke, Grevillea 14: 17. 1885.

Boletus pinicola Sw. Sv. Vet. Akad. Handl. 88. 1810. *Polyporus pinicola* Fries, Syst. Myc. 1: 372. 1821.

Plants perennial, sessile; pileus plane to convex, rarely unguulate, dimidiate, 4-15 x 6-20 x 3-10 cm., woody and rigid, grayish to black, partly or entirely covered with a reddish gluten that forms a crust over the surface, glabrous, sometimes concentrically sulcate, margin thin or thick, often obtuse; context pallid or wood-colored, corky to woody, 0.5-2 cm. thick; tubes 3-5 mm. long, distinctly or indistinctly stratified, the mouths white to umber, circular, averaging 3-5 to a mm., the walls thick and entire.

On dead wood, usually of coniferous trees.

Distinguished from closely related species by the resinous, somewhat sticky, reddish crust found on the pileus. The plant is common wherever coniferous woods are found. Hard (Mushrooms f. 348) gives a photograph of it but does not state that he ever collected it in Ohio.

6. *F. fraxineus* Bull. ex Cooke, Grevillea 14: 21. 1885.

Boletus fraxineus Bull. Herb. Fr. pl. 433. f. 2. 1789. *Polyporus fraxineus* Bull. ex Fries, Syst. Myc. 1: 374. 1821.

Plants annual or perennial, sessile, sometimes imbricate; pileus dimidiate, 4-10 x 6-15 x 0.6-2 cm., corky when fresh, rigid and woody when dry, light colored, always with reddish or reddish brown stains, or altogether reddish, encrusted with a thin hard crust, minutely velvety to glabrous, more or less zonate, margin thin or thick, acute; context floccose-punky

to corky, whitish or pallid when dry, tinged pinkish or flesh-colored when fresh, 0.2–2 cm. thick; tubes 2–6 mm. long, usually in a single layer but sometimes stratified, mouths whitish, pallid, or flesh-colored, circular or subcircular, averaging 4–6 to a mm., the dissepiments rather thick and entire; spores (teste Murrill) subglobose, smooth, subhyaline, 5–6 x 6–7 μ .

Usually found on living *Fraxinus* but sometimes on other hosts. Rare.

The habitat, the reddish blotches on the pileus, and the pinkish hymenium and context in fresh specimens will identify the plant. But three collections are known from Ohio; one by Morgan, one by W. G. Stover near Columbus, in 1910, and one near Camden, Ohio, by the writer, in 1912. All of these collections are of the annual form.

7. *F. carneus* Nees ex Cooke, Grevillea 14: 21. 1885.

Polyporus carneus Nees, Nova Acta Acad. Leop. Carol. 13: pl. 3. 1827.

Plants annual or perennial, sessile; pileus dimidiate, 1.5–5 x 1.5–10 x 0.3–1.5 cm., soft-corky when fresh, firmer when dry, pinkish or rosy, sometimes blackish with age, velvety to glabrous, usually azonate, margin thin and acute; context pinkish or rosy, floccose or punky to soft-corky, 0.2–1 cm. thick; tubes 0.5–3 mm. long, usually in a single layer but sometimes stratified, mouths pinkish or rosy, circular or subcircular, averaging 3–5 to a mm., dissepiments thick and entire.

Usually on wood of coniferous trees. Rare.

The species will be recognized by the uniform pinkish color of the whole plant. The color is well retained on drying. Specimens are in the herbarium of the New York Botanical Garden, collected by James, in Ohio. Authorities disagree as to the identity of *F. carneus* and *F. roseus* Fries ex Cooke.

8. *F. graveolens* Schw. ex Cooke, Grevillea 13: 118. 1884.

Boletus graveolens Schw. Syn. Fung. Car. 97. 1822. *Polyporus conglobatus* Berk. Hooker's Lond. Jour. Bot. 4: 303. 1845.

Plant composed of numerous overlapping pilei arising from a central solid core and forming a more or less globose or cylindrical mass 5–12 cm. in diameter; pilei not more than 2 cm. broad, but connate laterally, corky when fresh, rigid and firm when dry, grayish brown to dull cinnamon-brown, becoming

black in weathered specimens, slightly encrusted, pulverulent to glabrous, azonate or marked with fine grayish zones, margin thick, deflexed and almost concealing the pores; context fulvous to golden brown rust-colored, floccose-fibrous, 1-4 mm. thick; tubes 2-4 mm. long, the mouths grayish, hoary brown, or umber, circular, averaging 3-4 to a mm., the dissepiments thick and entire.

On logs or trunks of deciduous trees, especially *Fagus*, *Quercus*, and *Acer*. Rare.

A characteristic plant that will be recognized at sight. It is commonly known as "sweet knot" from the sweet, powerful odor that it is said to give off. The writer has made four different collections of this rare plant in different stages of growth but has never been able to detect the slightest semblance of a sweet odor. The plant is exceptionally well illustrated by Lloyd (Myc. Notes, Polyp. Issue 3: f. 367-68; Syn. Stip. Polyp. f. 455), and Hard (Mushrooms f. 334). The first and the last of the figures cited are upside down.

9. *F. conchatus* Pers. ex Gill. Champ. Fr. 1:685. 1878.

Boletus conchatus Pers. Obs. Myc. 1:24. 1796. *Polyporus conchatus* Fries, Syst. Myc. 1:376. 1821.

Plants perennial, sessile, or more often effused-reflexed and frequently entirely resupinate; pileus dimidiate to conchate, 0-7 x 4-12 x 0.2-3.5 cm., woody, grayish brown, yellowish brown or black, rarely encrusted, tomentose at least on the margin, becoming glabrous behind, zonate or concentrically sulcate and sometimes somewhat rimose, margin thin, mostly acute; context yellowish brown to dark brown, woody, 1.5-3 mm. thick; tubes 1-2 mm. long, indistinctly stratified, mouths fulvous to dark brown, usually glistening, circular or subcircular, averaging 4-6 to a mm.

On dead wood, rarely on living trees. Common.

The plant is most frequently found entirely resupinate on old oak logs. Distinctly sessile forms are sometimes found, especially on living trees. The hymenium usually has a silky luster when viewed in changing positions, and on the whole the plant is so characteristic that when once recognized, the collector usually has no trouble with subsequent collections notwithstanding the fact that the species often presents great

differences in size and habit. In Europe the plant is usually known as *F. salicinus* Pers. ex Gill. and it was so reported from Ohio by Morgan. It is entirely different from all other species of *Fomes* except *F. fulvus* Scop. ex Gill. and *F. ribis* Schum. ex Fries in the thin pileus, often conchate in form and with a concave hymenium. Usually the pileus is not more than 1 cm. thick. *F. fulvus* Scop. ex Gill. is distinct in its habitat as is also *F. ribis* Schum. ex Fries.

10. *F. fulvus* Scop. ex Gill. Champ. Fr. 1: 687. 1878.

Boletus fulvus Scop. Fl. Carn. 2:469. 1772. [2nd ed.] *Polyporus fulvus* Fries, Epicr. Syst. Myc. 466. 1838.

Plants perennial, sessile, effused-reflexed or entirely resupinate; pileus dimidiate, convex, 0-4 x 3-8 x 0.5-3 cm., woody, fulvous to ferruginous when young, becoming grayish black or black in age, encrusted, minutely velvety to glabrous, sometimes sulcate, margin rather thick, acute or obtuse; context dark brown, woody, 3-8 mm. thick; tubes 2-4 mm. long, rather distinctly stratified, the mouths circular to slightly angular, grayish brown to tawny, averaging 4-5 to a mm., dissepiments rather thick, entire.

Growing only on wood of species of *Prunus*. Not common.

One should have no trouble in identifying this species if the habitat is taken into consideration as it is the only perennial form that grows on *Prunus*. Morgan reported it under the name of *F. supinus* Schw.

11. *F. rimosus* Berk. ex Cooke, Grevillea 14:18. 1885.

Polyporus rimosus Berk. Hooker's Lond. Jour. Bot. 4:54. 1845. *Pyropolyporus robiniae* Merrill, Bull. Torr. Bot. Club 30:114. 1903.

Plants perennial, sessile; pileus dimidiate, convex to unguulate, 3-20 x 6-30 x 1.5-10 cm., woody, at first fulvous, becoming dark brown or black, not encrusted, velvety in young specimens, glabrous and very rimose in old plants, concentrically sulcate, margin thick or thin, obtuse or acute; context fulvous to rusty brown, woody, 0.5-3 cm. thick, zonate; tubes 1-5 mm. long, indistinctly stratified in many layers, the mouths fulvous to rusty brown, circular, averaging 5-6 to a mm., walls rather thick and entire; spores brown, smooth, globose, 4-5 μ in diameter.

Growing only on living trunks of *Robinia*. Common.

The type locality for *F. rimosus* is given by Berkeley as the Swan River, Australia, and not Demerara and the Cape of Good Hope, as cited by Saccardo and by Murrill. If the specimens Murrill examined are from the two latter places, it is still possible that our plants belong under *F. rimosus*. Our species also occurs in South Africa as specimens examined from that locality agree well with our plants.

The plant is never found on any other host than the locust tree. This will distinguish it from all of its allies. Its closest relatives appear to be *F. Everhartii* Ellis & Gall. and *F. igniarius* L. ex Gill. The plant is well illustrated by Hard (Mushrooms f. 347), and by von Schrenk (Ann. Rept. Mo. Bot. Gard. 12: pl. 2).

12. *F. Everhartii* Ellis & Gall.¹

Mucronoporus Everhartii Ellis & Gall. Jour. Myc. 5:141. 1889.

Plants perennial, sessile or decurrent; pileus dimidiate, convex, rarely unguulate, 2.5–10 x 4–20 x 2–6 cm., woody, entirely fulvous when young but becoming grayish brown or black and rough and rimose with age, velvety when young, glabrous when mature, scarcely encrusted, concentrically sulcate with age, margin thin or thick, acute or obtuse, usually remaining fulvous in color; context fulvous to rusty brown, shining (at least in herbarium specimens), zonate, woody, 1–4 cm. thick; tubes 3–6 mm. long, indistinctly stratified, tubes of the older layers sometimes partly stuffed with mycelium, the mouths concolorous with the context, circular, averaging 4–5 to a mm., the walls rather thin but entire, sometimes glistening; spores distinctly brown, smooth, globose, 4–5.3 μ in diameter.

On living trees, usually of *Quercus*. Not uncommon.

Distinguished from *F. igniarius* L. ex Gill. and *F. nigricans* Fries ex Gill. by the absence of the distinct encrustation or stuffing of the tubes in the old layers, by the more shining context, the somewhat thinner dissepiments, the hyaline spores, and the absence of a distinct crust on the pileus. The two

¹ *F. Everhartii* was originally described under the genus *Mucronoporus* and as far as I have been able to find, no specific statement of transfer to the genus *Fomes* was ever made. At the present time I have not been able to satisfy myself as to who was the first to make (unknowingly, it seems) the new combination, and therefore I do not know to whom credit for the transfer should be given.

species are closely related, however, and without the spores it is sometimes difficult to decide between them. The species differs from *F. fomentarius* L. ex Gill. and *F. applanatus* Pers. ex Wallr. in the unencrusted pileus, the woody context, and the short tubes.

13. *F. igniarius* L. ex Gill. Champ. Fr. 1:687. 1878.

Boletus igniarius L. Sp. Plant. 1176. 1753. *Polyporus igniarius* Fries, Syst. Myc. 1:375. 1821.

Plants perennial, sessile; pileus dimidiate, convex to somewhat unguulate, 2.5-11 x 4-25 x 1.5-12 cm., woody, grayish black, or entirely black, encrusted, sometimes somewhat rimose in age, glabrous, concentrically sulcate in older plants, margin rather thin, acute, usually grayish in growing specimens; context rusty red or rusty brown, scarcely shining, zonate, woody, 0.5-4 cm. thick; tubes 2-5 mm. long, usually indistinctly stratified, the older layers becoming distinctly whitish encrusted, the mouths circular, grayish brown to dark brown, averaging 4-5 to a mm., the walls thick and entire; spores (teste Romell) hyaline, subglobose, 5-7.5 x 4-7 μ , often 1-guttate.

On trunks of living deciduous trees. Not common.

In no other species is the stuffing or encrusting of the tubes by a whitish substance so evident as in this and the next one. In *F. Everhartii* Ellis & Gall. the tubes appear to be sometimes filled with a whitish mycelium but the character is scarcely evident except on close examination, while in *F. igniarius* and *F. nigricans* Fries ex Gill. in sections through the hymenium the whitish encrustation is plainly visible, and seems to be a distinguishing character. The plant is further to be distinguished from *F. Everhartii* by the hyaline spores, and the thicker dissepiments. The pores are somewhat smaller, but in measuring them the thick dissepiments are included, so that the number per mm. is about the same in the two species. From *F. fomentarius* L. ex Gill. and *F. applanatus* Pers. ex Wallr. the species is separated by the more woody context, the thinner crust, and the much shorter tubes, as well as by the hyaline spores. In *F. igniarius* the pileus is darker in color and is usually much more rimose than in *F. nigricans*. For illustrations see Atkinson, Cornell Univ. Agr. Exp. Sta. Bul. 193:f. 73-4.

14. *F. nigricans* Fries ex Gill. Champ. Fr., Hymen. 1: 685. 1878.

Polyporus nigricans Fries, Syst. Myc. 1:375. 1821.

Plants perennial, sessile; pileus dimidiate, convex to unguulate, distinctly triangular in cross-section, 5–10 x 7–13 x 2–7 cm., woody, dull brown or becoming brownish black, not encrusted, smooth or cracking somewhat in age but scarcely rimose, azonate or with one or two concentric furrows, the margin thick, acute or obtuse, with a broad ferruginous band; context rusty brown, zonate, woody, 0.6–2 cm. thick; tubes 2–7 mm. long, distinctly or indistinctly stratified, becoming distinctly white encrusted or stuffed in the older layers, the mouths dark brown, circular, minute, averaging about 5 to a mm., the walls thick and entire; spores white, subglobose or globose, 6.5μ in diameter.

On trunks of trees, especially on *Betula*. Not common.

I have one collection of this fungus from W. A. Kellerman. The species has been confused with the preceding one from which it differs in the smoother and differently colored pileus and in being more decidedly triangular in cross-section. The best illustration is that given by Boudier (Ic. Myc. 1: pl. 155).

15 *F. fomentarius* L. ex Gill. Champ. Fr. 1:686. 1878.

Boletus fomentarius L. Sp. Plant. 1176. 1753. *Polyporus fomentarius* Fries, Syst. Myc. 1:374. 1821.

Plants perennial, sessile; pileus dimidiate, convex to strongly unguulate, 3.5–15 x 6–20 x 2–9 cm., hard and woody, grayish to cinereous, brownish, or black, covered with a thick horny crust that appears black and shining when cut, glabrous, smooth, never rimose, zonate or concentrically sulcate, margin thick and obtuse; context fulvous to ferruginous, never shining, punky to soft-corky, zonate, 0.3–3 cm. thick; tubes 0.5–2.5 cm. long, rather distinctly stratified, mouths grayish to cinnamon, averaging 3 to a mm., the walls thick and entire.

On living deciduous trees. Not common.

Distinguished from all of the preceding species by the punky or soft-corky context and the usually longer tubes. Most closely related to *F. applanatus* Pers. ex Wallr. but distinguished from it by the much longer pores and the hyaline spores. For

illustrations see Kellerman, Journ. Myc. 9: pl. 3., and White, Hymen. Conn. pl. 35. f. 2.

16. **F. applanatus** Pers. ex Wallr. Crypt. Fl. Ger. 2:591. 1833.

Boletus applanatus Pers. Obs. Myc. 2: 2. 1799. *Polyporus applanatus* Fries, Epicr. Syst. Myc. 465. 1838. *P. leucophæus* Mont. Syll. Crypt. 157. 1856.

• Plants perennial, sessile; pileus dimidiate, convex or plane, not unguulate, 3-30 x 5-50 x 1.5-7 cm., woody, usually grayish becoming brownish or blackish, glabrous, covered with a thick horny crust, zonate or concentrically sulcate, margin thin or thick, acute or obtuse; context dark ferruginous brown, floccose to soft corky, 0.6-2 cm. or more thick; tubes 0.5-1.5 cm. long, distinctly stratified after the first season, the strata separated by thin layers of context, mouths whitish to umber, darker when bruised, circular, minute, averaging 5-6 to a mm.

On dead wood of deciduous trees or on living trees. Common.

This is our most common species of *Fomes* and may be found in every woodlot, usually on stumps or old logs. It is distinguished from *F. fomentarius* L. ex Gill. by the more applanate pileus and the minute mouths of the tubes. For illustrations see Atkinson, Mushrooms f. 15., White, Hymen. Conn. pl. 35. f. 1., and Atkinson, Cornell Univ. Agr. Exp. Sta. Bul. 193: f. 82.

17. **F. lobatus** Schw. ex Cooke, Grevillea 14:18. 1885.

Polyporus lobatus Schw. Trans. Am. Phil. Soc. II. 4:157. 1832. *P. reniformis* Morgan, Journ. Cin. Soc. Nat. Hist. 8:105. 1885.

Plants annual, frequently reviving for two or three years but the second year's growth distinct from and coming out below that of the first year, sessile or more often appearing substipitate; pileus dimidiate or reniform, plane, depressed, or somewhat convex, never unguulate, 4-12 x 4-15 x 1-3 cm., corky or somewhat flexible when growing, usually umber to yellowish or dark rusty brown, glabrous, covered with a thin, easily indented crust, zonate or concentrically sulcate, margin thin and acute; context dark rusty brown, soft and floccose to punky, 0.3-1 cm. thick; tubes 0.4-1 cm. long, not stratified, mouths circular or subcircular, white, yellowish or umber-

brown, darker when bruised, averaging 4 to a mm., walls rather thin but entire.

On dead wood of deciduous trees. Common.

This species is easily separated from *F. applanatus* Pers. ex Wallr. in that it is not perennial, and in that, if the plant revives the second year, the pileus comes out below that of the first year, and the latter persists as a dead decaying pileus. The second difference is in the character of the encrusting layer of the pileus. In *F. applanatus* Pers. ex Wallr. the crust is hard and horny and one cannot indent it with the thumb nail, while in *F. lobatus* the crust is thin, and often becomes cracked and brittle when old, but is always rather soft and easily indented.

TRAMETES Fries, Gen. Hymen. 11. 1836.

Plants annual or perennial, epixylous, sessile; pileus corky or woody in texture, small or medium sized; context white or brown (never red), descending into and forming the walls of the tubes; tubes typically appearing sunken into the context to unequal depths so that their bases are not in a continuous straight line; mouths circular or angular, never breaking up into teeth and rarely showing a daedaloid tendency.

One species here included in the genus is perennial, all the others are annual. The chief generic distinctions are the unequal depths to which the tubes are immersed in the context, and the homogeneous texture of the context and trama. The first distinction is often not apparent except on very close examination, and at times appears to break down entirely. Consequently, students will meet with some difficulty at times in deciding between the two genera, *Trametes* and *Polyporus*.

KEY TO THE SPECIES

- | | |
|---|-------------------------------------|
| Context white or whitish | 1 |
| Context brown or brownish | 6 |
| 1. Pileus densely hirsute or hispid | 7. <i>T. Peckii</i> |
| 1. Pileus slightly pubescent to glabrous | 2 |
| 2. Mouths of the tubes minute, averaging 4-6 to a mm. | <i>T. robiniophila</i> ¹ |
| 2. Mouths of the tubes larger, averaging 1-3 to a mm. | 3 |
| 3. Pileus rather large; context more than 5 mm. thick; plant growing only on <i>Salix</i> | 3. <i>T. suaveolens</i> |
| 3. Pileus small, sometimes mostly resupinate; context less than 5 mm. thick; found on some other host | 4 |

¹ For description of this plant see p. 104 under the genus *Polyporus*.

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|--|-----------------------|
| 4. Hymenium light brown in color..... | 4. <i>T. malicola</i> |
| 4. Hymenium white or whitish..... | 5 |
| 5. Pileus white or light colored; mouths of the tubes averaging 1-2 to a mm. | 1. <i>T. sepium</i> |
| 5. Pileus cinnamon-brown; mouths of the tubes averaging about 3 to a mm. | 2. <i>T. serialis</i> |
| 6. Sporophore woody, perennial; hymenium bright yellowish brown in color; mouths of the tubes often somewhat daedaloid; growing only on <i>Pinus</i> | 8. <i>T. Pini</i> |
| 6. Sporophore coriaceous or corky; hymenium white or dull brown; growing on wood of deciduous trees..... | 7 |
| 7. Pileus hirsute or hispid..... | 8 |
| 7. Pileus finely tomentose or glabrous..... | 9 |
| 8. Mouths of the tubes large, averaging 1 to a mm.; pileus more than 4 mm. thick..... | 7. <i>T. Peckii</i> |
| 8. Mouths of the tubes medium sized, averaging 2-3 to a mm.; pileus less than 4 mm. thick..... | 6. <i>T. rigida</i> |
| 9. Context less than 1 mm. thick..... | 5. <i>T. mollis</i> |
| 9. Context more than 1 mm. thick..... | 4. <i>T. malicola</i> |

1. *T. sepium* Berk. Hooker's Lond. Jour. Bot. 6:322. 1847.

Plants annual, sessile or semirespuinate, imbricate or single; pileus dimidiate, 0.7-1 x 0.8-2.5 x 0.2-0.7 cm., flexible when fresh, corky when dry, grayish to pallid or wood-colored, minutely tomentose to glabrous, azonate, margin thin and acute; context white or pallid, tough when fresh, soft-corky when dry, less than 1 mm. thick; tubes 2-5 mm. long, mouths white or pallid, circular or rarely angular or sinuous, large, averaging almost 1 to a mm., the dissepiments thick and always entire; spores (teste Murrill) oblong, smooth, hyaline, 12 x 5 μ .

On fence posts, pickets, and other structural timber or dead wood.

Distinguished from *T. serialis* Fries by the short tubes, the whitish color of the pileus, and by the much larger mouths of the tubes; from *T. rigida* Berk. & Mont. by the lighter colored context, and the larger tube mouths.

2. *T. serialis* Fries, Hymen. Eur. 585. 1874. [2nd ed.]

Polyporus serialis Fries, Syst. Myc. 1:370. 1821.

Plants annual, sessile, effused-reflexed, or resupinate; pileus dimidiate, 0-1 x 1-4 x 0.3-0.8 cm., corky when fresh, hard and firm when dry, cinnamon-brown to coffee brown, glabrous, zonate, margin rather thick but acute; context white, fibrous, not more than 1 mm. thick; tubes 2-6 mm. long, the mouths

white or slightly discolored, sometimes slightly glistening, circular to angular, averaging 3 to a mm., the walls firm and entire; spores (teste Bresadola) hyaline, elongate, 7-10 x 3-3.5 μ .

On dead wood. Rare.

The white pores and the internally white tubes contrast strongly with the rich brown color of the pileus. It is distinct from *T. rigida* Berk. & Mont. in the glabrous, thicker pileus. From *T. sepium* Berk. it differs in the much smaller pores and the brown pileus; *T. malicola* has no white color in the tubes and the dissepiments are much thicker.

3. *T. suaveolens* L. ex Fries, Syst. Myc. 1:366. 1821.

Boletus suaveolens L. Sp. Plant. 1177. 1753.

Plants annual, sessile; pileus dimidiate, 3-9 x 6-14 x 1-3 cm., corky when fresh, firm and rigid when dry, white to grayish or slightly yellowish, finely villous-tomentose to glabrous, azonate, margin thin or thick, acute; context white or pallid, compact-corky to somewhat indurate, 0.5-2 cm. thick; tubes 0.2-1.5 cm. long, the mouths white or cinereous, circular to slightly angular, averaging 1-3 to a mm.

On dead or diseased *Salix*. Rare.

Distinguished from *T. Peckii* Kalchbr. by the prevailing whitish color and the more nearly glabrous pileus.

4. *T. malicola* Berk. & Curt. Journ. Acad. Nat. Sci. Phil. II. 3:209. 1856.

Plants annual or reviving for two or three seasons, effused-reflexed or entirely resupinate; pileus very narrow, 0-1 x 1-5 x 0.3-0.8 cm., coriaceous and leathery when fresh, corky when dry, avellaneous to cinnamon-brown or wood-colored, azonate, margin thick but acute; context wood-brown or lighter, soft-corky, 2-5 mm. thick; with a distinct pleasant odor when fresh; tubes 2-5 mm. long, sometimes indistinctly stratified in two or three layers, mouths wood-colored to cinnamon-brown, circular to angular or somewhat sinuous, averaging about 2 to a mm., the walls thick and entire; spores white, smooth, oblong, 2.8-3.5 x 7.5-10 μ .

Growing on dead wood of deciduous trees, especially species of *Acer*. Common.

Entirely distinct from *T. sepium* Berk. in the semiresupinate

habit of growth, the prevailing dull brown color of both hymenium and pileus, and the smaller-mouthed tubes. In this last respect the plant more nearly approaches *T. serialis* Fries and *T. rigida* Berk. & Mont. From the former it is separated by the browner color of the hymenium, the lighter color of the pileus, the internally brown tubes, and the slightly larger and more irregular mouths. From the latter it differs chiefly in the more glabrous and less developed pileus and the longer tubes.

The type specimens of *T. malicola* were collected on the trunk of an apple tree by Schweinitz and referred by him to *P. populinus* Fries. Murrill has placed the name as a doubtful synonym for *P. galactinus* Berk. The writer has not examined the type of *T. malicola*, but our plants bear no resemblance to either *P. populinus* Fries or *P. galactinus* Berk. Our plants were determined by Lloyd and by Bresadola.

5. *T. mollis* Sommerf. ex Fries, Hymen. Eur. 585. 1874.

Daedalea mollis Sommerf. Suppl. Fl. Lapp. 271. 1826.

Plants annual or rarely reviving, rarely sessile, more often effused-reflexed or entirely resupinate; pileus dimidiate or elongate, 0–2.5 x 1–4 x 0.1–0.5 cm., coriaceous to rigid, umber-brown to almost black, finely tomentose to glabrous, zonate or multizonate, margin thin and acute; context light brown, fibrous, less than 1 mm. thick; tubes 2–3 mm. long, rarely in two or three layers, mouths light brown or grayish, subcircular to somewhat angular, often becoming sinuous or labyrinthiform, averaging 1–3 to a mm.; spores (teste Bresadola) elongate-ellipsoid, smooth, hyaline, 9–11 x 4–4.5 μ .

On dead wood. Rare.

The species differs from *T. rigida* Berk. & Mont. in the distinctly brown and almost glabrous pileus. From *T. serialis* Fries it differs in the light brown context, the much thinner pileus and the usually larger and more irregular pores. The context is much thinner than in *T. malicola* Berk. & Curt. and the general color is decidedly different.

6. *T. rigida* Berk. & Mont. Ann. Sci. Nat. III. 11:240. 1849.

Plants annual or rarely reviving, sessile, effused-reflexed or entirely resupinate, sometimes imbricate; pileus dimidiate,

0.3 x 2.6 x 0.1–0.3 cm., coriaceous when fresh, coriaceous or rigid when dry, cinereous to yellowish or slightly brownish, hirsute to hispid, usually zonate, sometimes with multicolored zones, margin very thin and acute; context light umber, fibrous, 0.5–3 mm. thick; tubes not more than 1 mm. long, the mouths white or brownish, circular to somewhat angular, averaging 2–3 to a mm., the walls rather thin but entire.

On dead wood. Not common.

Distinguished from all of its allies in the hirsute or hispid pubescence of the pileus. The pileus is thin and coriaceous and more nearly resembles the thin coriaceous species in *Polyporus*.

7. *T. Peckii* Kalchbr. Bot. Gaz. 6: 274. 1881.

Plants annual, sessile or effused-reflexed; pileus dimidiate, 1.5–6 x 2.5–12 x 0.5–2 cm., somewhat coriaceous when fresh, firm and rigid when dry, yellowish brown or reddish brown, densely hirsute or hispid, concentrically sulcate at times, margin thick or thin, acute; context light brown, fibrous, soft and spongy to firm and woody, 1–10 mm. thick; tubes 2–10 mm. long, the mouths dull brown or grayish brown, angular to irregular, averaging about 1 to a mm.; spores (teste Murrill) oblong or slightly curved, smooth, hyaline, 11–13 x 3.5–4 μ .

On dead wood of *Populus*, *Liriodendron*, and *Salix*. September to December. Frequent.

Easily recognized by the densely hirsute or hispid pubescence, the large pores, and the habitat. In Europe the species is known as *T. hispida* Fries.

8. *T. Pini* Thore ex Fries, Epicr. Syst. Myc. 489. 1838.

Boletus Pini Thore, Essai Chlor. Dep. Land. 487. 1803.

Plants perennial, sessile or effused-reflexed; pileus dimidiate, often unguulate, 3–15 x 5–20 x 1–6 cm., woody, yellowish brown to reddish brown or becoming black, the growing margin hirsute to tomentose, glabrous behind, zonate or concentrically sulcate, margin usually thick and somewhat obtuse; context yellowish brown to rusty brown, corky to woody, not more than 5 mm. thick; tubes 2–7 mm. long, indistinctly stratified, the mouths usually golden brown, subcircular to daedaloid and labyrinthiform; spores (teste Bresadola) hyaline, subglobose, 5–6 x 4–5 μ .

On coniferous wood. Rare.

The bright color of the hymenium usually contrasts strongly with the darker colors of the upper surface. *P. piceinus* Peck (= *Trametes Abietis* Karst.), which by some is regarded as a form of *T. Pini*, has never, to the writer's knowledge, been collected within the state.

SPECIES DOUBTFUL OR EXCLUDED

T. nivosus Berk. was erroneously reported from Ohio by Morgan. It is a tropical and subtropical species.

DAEDALEA Pers. ex. Fries,

Syst. Myc. 1: 331. 1821; Pers. Syn. Fung. 499. 1801.

Plants annual or rarely reviving for two or three years, sessile or effused-reflexed, growing on wood; pileus coriaceous to corky in texture, not encrusted; context white or whitish, fibrous or corky; hymenium typically daedaloid or labyrinthiform, but sometimes poroid, irpiciform or lamellate; spores white.

KEY TO THE SPECIES

- Pileus small, thin and coriaceous, hirsute or villous; hymenium at first sinuous and daedaloid but soon breaking up into teeth.....1. *D. unicolor*
- Pileus rather large and thick, corky, minutely velvety or glabrous; hymenium poroid, daedaloid, or somewhat lamellate but never breaking up into teeth..... 2
2. Mouths of the tubes less than 1 mm. broad.....2. *D. ambigua*
2. Mouths of the tubes more than 1 mm. broad..... 3
3. Pileus less than 1.5 cm. thick; walls of the tubes thin; plant found abundantly on *Salix*.....3. *D. confragosa*
3. Pileus more than 1.5 cm. thick; walls of the tubes thick; plant growing on *Quercus* and *Castanea*.....4. *D. quercina*

1. *D. unicolor* Bull. ex Fries, Syst. Myc. 1: 336. 1821.

Boletus unicolor Bull. Herb. Fr. pl. 408. 1788.

Plants annual or sometimes the marginal hyphæ reviving and continuing growth the second year, sessile, or effused-reflexed, imbricate; pileus dimidiate to flabelliform, 0.5–5 x 2–8 x 0.2–0.5 cm., coriaceous, white to cinereous or light brown, sometimes green from a covering of algæ, villous or hirsute, zonate or concentrically furrowed, margin thin, acute, sterile below; context white or pallid, fibrous, less than 1 mm. thick; tubes 1–4 mm. long, the mouths white to cinereous or umber, at first

dædaloid and sinuous, but soon breaking up into teeth—though retaining the sinuous character at the margin of the pileus—, averaging about 2 to a mm.

On dead wood. Common.

This plant may at first prove puzzling to the collector, as it was to me when first collected, for the thin, flexible pileus and the usually toothed hymenium indicate a close relationship with the thin coriaceous species of *Polyporus*, or even with *Irpea*. But the pores are decidedly sinuous, at least in young plants. The thin pileus and the hirsute or villous pubescence separate the species from other members of the genus.

2. *D. ambigua* Berk. Lond. Jour. Bot. 4: 305. 1845.

Trametes lactea Berk. Hooker's Lond. Jour. Bot. 4: 305. 1845.

Plants annual or rarely reviving for two or three years, sessile, sometimes appearing substipitate; pileus dimidiate to reniform, 3–14 x 5–20 x 0.3–1.5 cm., slightly flexible when fresh, corky when dry, pure white to umbrinous, sometimes purplish black at the base, minutely velvety to glabrous, azonate or subzonate on the margin, margin rather thin, acute; context white or pallid, floccose-punky to corky, 0.2–1 cm. thick; tubes 2–4 mm. long, sometimes stratified in two or three layers, mouths whitish or yellowish, circular to sinuous and dædaloid, never lamellate, averaging 2–3 to a mm. in transverse direction, walls rather thick and entire.

On stumps and trunks of deciduous trees. Common.

Distinguished from *D. confragosa* Bolt. ex Fries by the white color, the white context, the smaller pores and the habitat. Hard (Mushrooms *f.* 355–56) gives excellent illustrations of the plant.

3. *D. confragosa* Bolt. ex Fries, Syst. Myc. 1: 336. 1821.

Boletus confragosus Bolt. Hist. Fung. Suppl. 3: 160. 1791.

Lenzites Crataegi Berk. Hooker's Lond. Jour. Bot. 6: 323. 1847.

Plants annual, sessile; pileus dimidiate, 2–10 x 3–15 x 0.2–1.5 cm., slightly flexible to rigid, grayish or cinereous, rarely slightly brownish, minutely tomentose to glabrous, zonate, margin thin and acute; context whitish, floccose to corky, 0.2–1 cm. thick; tubes 0.1–1 cm. long, mouths whitish to cinereous, sometimes slightly reddish, darker when bruised, subcircular at times but usually sinuous, dædaloid, or labyrinthiform, sometimes becom-

ing lamellate in old plants, 0.5–1.5 mm. broad; spores white, smooth, oblong, mostly curved, $1.5-2 \times 6.2-7.5 \mu$.

On dead wood or on living trees, especially of *Salix*. Common.

This is a very variable species. Sometimes very thin forms are found and such have been considered as species at different times. *Trametes rubescens* Alb. & Schw. ex Fries is a thin form with a reddish hymenium. For illustrations, see Hard, Mushrooms f. 358., White, Hymen. Conn. pl. 34. f. 2., and Moffatt, Higher fungi of the Chicago region pl. 18.

4. *D. quercina* L. ex Fries, Syst. Myc. 1: 333. 1821.

Agaricus quercinus L. Sp. Plant. 1176. 1753.

Plants annual, or sometimes reviving, sessile; pileus dimidiate, convex, 4–12 x 4–15 x 1.5–6 cm., corky, whitish to umbinous or almost black, glabrous, margin usually thick and obtuse; context whitish, corky, 0.2–1 cm. thick; tubes 1–2 cm. long, the mouths whitish to umber, rarely circular, more often labyrinthiform and elongate or lamellate, 1 mm. or more broad, edges thick and entire.

On *Castanea* and *Quercus*, sometimes on the living trees. Rare.

This species is distinct from all of the others in its habitat, the thickness of the pileus, and the larger sinuous pores. Hard (Mushrooms f. 357), and White (Hymen. Conn. pl. 34. f. 1) give illustrations of the plant.

LENZITES Fries, Gen. Hymen. 10. 1836.

Pileus coriaceous to corky, dry and floccose in texture. Lamellæ coriaceous, firm, sometimes simple and unequal, sometimes anastomosing behind and forming pores; trama floccose and similar to the pileus, the edge subacute. Dimidiate, sessile, persistent fungi growing on wood and resembling *Dædalea*. (The above description is according to Fries, Epicr. Syst. Myc. 403.)

This genus is intermediate in position between the *Agariceæ* and the *Polyporaceæ* and is sometimes included among the white spored genera of the former family.

KEY TO THE SPECIES

- | | |
|---|-----------------------|
| Context white..... | 1. <i>L. betulina</i> |
| Context brown..... | 1 |
| 1. Tubes or interspaces 1 mm. or more broad; lamellæ usually not much anastomosing..... | 3. <i>L. sæpiaria</i> |
| 1. Tubes or interspaces less than 1 mm. broad; lamellæ freely anastomosing..... | 2. <i>L. vialis</i> |

1. *L. betulina* L. ex Fries, Epicr. Syst. Myc. 405. 1838.

Agaricus betulinus L. Sp. Plant. 1176. 1753.

Plant annual, sessile, often imbricate; pileus dimidiate, 2-5 x 2-9 x 0.3-1 cm., coriaceous to somewhat corky, prevailing color grayish to brownish, marked with many narrow, multi-colored zones, tomentose; margin thin and acute; context white, usually not more than 1 mm. thick; hymenium usually lamellate but sometimes poroid, the lamellæ coriaceous, about 1 mm. apart, 0.3-1 cm. broad, white or whitish; spores globose, smooth, hyaline, 5-6 μ in diameter.

On all kinds of dead wood of deciduous trees. Common.

L. flaccida Fries as reported from Ohio is but a form of this species. The plant is well represented by Hard (Mushrooms *f.* 185-86), Lloyd (Photogr. *pl.* 14), and fairly well in Cooke, Illustrations *pl.* 1145.

2. *L. vialis* Peck, Ann. Rept. N. Y. State Mus. 26:67.
1874.

Dædalea pallido-fulva Berk. Hooker's Lond. Jour. Bot.
6: 322. 1847.

Pileus annual, sessile, imbricate or single, dimidiate or laterally connate, 1-4 x 2-7 x 0.2-0.8 cm., coriaceous or corky, grayish brown to cinnamon-brown, often darker at the base, subtomentose to glabrous, azonate or subzonate, margin acute; context brown, floccose-fibrous to soft-corky, 1-4 mm. thick; hymenium more or less poroid or labyrinthiform, rarely decidedly lamellate, pores or lamellæ averaging 2-3 to a mm., 1-3 mm. broad, concolorous with the surface of the pileus; spores cylindrical to elliptical, smooth, hyaline, 2.7-4 x 7-8.2 μ .

On dead wood of both deciduous and coniferous trees. Common.

The species was described from Ohio as *Dædalea pallidofulva* Berk. and so reported by Morgan.

3. *L. saepiaria* Fries, *Epier. Syst. Myc.* 407. 1838.

Dædalea sæpiaria Fr. *Obs. Myc.* 1: 105. 1815.

Plants annual, sessile, often imbricate; pileus dimidiate or reniform, 1-5 x 2-7 x 0.3-1 cm., coriaceous to corky, bright yellowish red to dark ferruginous, often lighter or discolored with age, strigose-tomentose, zonate, margin thin; context fulvous to ferruginous, floccose to soft-corky, not more than 3 mm. thick; hymenium usually lamellate, the lamellæ about 1 mm. apart, 2-5 mm. broad, rarely anastomosing, fulvous to rusty brown; spores cylindrical, smooth, white, 2.7-4 x 2-10.2 μ .

Always found on dead wood of coniferous trees. Frequent.

Easily distinguished from the preceding species by the deeper color throughout and by the more distant lamellæ that rarely anastomose.

CYCLOMYCES Kunz. & Fries, *Linnaea* 5: 512. 1830.

Plants annual, terrestrial and stipitate in our species, coriaceous, fuscous or cinnamon-colored; context brownish, sometimes rusty brown, floccose to fibrous; hymenium poroid at first but soon breaking up into concentric lamellæ.

The genus is distinct from all others in the concentric arrangement of the lamellæ.

1. *C. Greenei* Berk. *Hooker's Lond. Jour. Bot.* 4: 306. 1845.

Pileus stipitate, circular in outline, usually depressed on top, 2.5-9 cm. broad, 0.5-2 cm. thick, coriaceous when fresh, rigid when dry, yellowish brown to rusty or purplish brown, tomentose at first but becoming glabrous, more or less zonate, margin thin and acute; context fulvous to cinnamon-brown, soft floccose to fibrous or somewhat friable, thin at the margin, thicker next the stipe; tubes 5-8 mm. long, soon breaking up to form brownish concentric lamellæ; stipe central or subcentral, expanding above into the pileus, velvety, somewhat spongy, 2-7 cm. long, 0.7-2 cm. thick, fulvous to rusty brown in color.

On the ground in woods. Rare.

The species was reported from Ohio by Hard but I think has not otherwise been collected. For illustration see Hard, *Mushrooms f. 360-61*.

FAVOLUS Fries, Elench. Fung. 1: 44. 1828.

Plants annual, epixylous, more or less stipitate; pileus fleshy-tough when fresh, small or medium sized; context white, thin; tubes in a single layer, the mouths angular, usually hexagonal, often radiating outward from the stipe and somewhat longer in the radial direction; spores white.

In our species the stipe is much reduced and is usually lateral or at least eccentric. The genus is separated from *Polyporus* by the large favoloid pores, although some stipitate species of *Polyporus* closely approach in pore form the condition ascribed to this family.

KEY TO THE SPECIES

- Plants about 2 cm. long and broad; hymenium more or less waxy or gelatinous.....1. *F. rhipidium*
Plants larger than above; hymenium not gelatinous or waxy.....2. *F. canadensis*

1. *F. rhipidium* Berk. Hooker's Lond. Jour. Bot. 6: 319. 1847.

Plants stipitate; pileus reniform, cæspitose-imbricate, 2 cm. long and broad, coriaceous, alutaceous to white, the cuticle breaking up into minute furfuraceous squamules, concentrically sulcate; context whitish, thin; tubes short, less than 2 mm. long, more or less waxy and gelatinous, the mouths white, angular to elongate, denticulate, averaging 2-3 to a mm.; stipe lateral, pruinose, 6-7 mm. long.

On dead wood. Rare.

The above description is adapted from the original. The species was originally described from Ohio from specimens collected by Lea. Morgan also probably collected it, but otherwise it is not known from the state. In habit and color it resembles *Panus stypticus*.

2. *F. canadensis* Klotzsch, Linnæa 7: 197. 1832.

F. ohioensis Berk. & Mont. Syll. Crypt. 171. 1856. *F. striatulus* Ellis & Ev. Am. Nat. 31: 339. 1856.

Plants stipitate, the stipe often reduced to a lateral tubercle; pileus dimidiate to reniform, 1-4 x 1-8 x 0.1-0.7 cm., fleshy-tough when fresh, rigid when dry, at first reddish brown due to the presence of innate fibrils of that color, later becoming glabrous and fading to cream color or pure white, azonate,

margin thin and acute, often involute, especially on drying; context white or whitish, fleshy-tough, becoming firmer on drying, 0.5–2 mm. thick; tubes 1–5 mm. long, the mouths whitish to yellowish, distinctly angular, usually rhomboid or hexagonal, often radiating outward from the stem and longer in the radial direction, very variable in size, 0.5–3 mm. long and averaging 1–3 to a mm. in transverse direction; stipe lateral or rarely subcentral, often rudimentary, not more than 1 cm. long, 1.5–7 mm. thick.

On dead branches of deciduous trees, especially *Hicoria*. Common.

F. striatulus Ellis & Ev. is supposed to differ from *F. canadensis* in having a pileus white in color from the first, and in the smaller pores. In Ohio both of these forms are found and the writer has come to the conclusion that *F. striatulus* is to be regarded as only a form of this rather polymorphic species, for the following reasons: First, specimens of *F. canadensis* frequently become whitish in color quite early in development; second, the small pores said to be characteristic of *F. striatulus* are also frequently found in specimens with the reddish brown pileus. In attempting to separate the plants into two species one finds reddish brown specimens with either large or small pores, and white specimens with either large or small pores. The species is illustrated in Hard, Mushrooms *f.* 359.

GLOEOPORUS Mont. Hist. Cuba 385. 1838.

Plants annual, sessile or effused-reflexed; pileus small, thin and coriaceous; context fibrous, thin, usually white; tubes short, more or less gelatinous or waxy and in our species separating from the context in a thin, elastic layer when fresh or when moistened. The genus is distinct from all others in the gelatinous and at the same time separable hymenium. One species only is found in our flora.

1. *G. conchoides* Mont. Hist. Cuba *pl.* 15. *f.* 1. 1838.

Sessile or effused-reflexed; pileus dimidiate or conchate, 0.5–3 x 1–4 x 0.1–0.5 cm., coriaceous when fresh, rigid when dry, white or cream-colored, velvety to glabrous, azonate, margin thin, acute, with a narrow sterile band below; context white, soft-fibrous, 1–4 mm. thick; tubes less than 1 mm. long,

gelatinous or waxy and separating from the context in a thin elastic layer when fresh or when moistened, the mouths flesh-colored to reddish purple or purplish black, circular, minute, averaging 5-6 to a mm.

On dead wood of deciduous trees. Common.

The waxy separating hymenium, reddish purple in color, will serve to distinguish this species. The plant has been known as *Polyporus dichrous* Fries.

MERULIUS Haller ex Fries,

Syst. Myc. 1: 326. 1821; Haller, Hist. Stip. Helv. 3: 150. 1768.

Hymenophore formed from a mycelial mucedinous context and giving rise to shallow irregular pores formed by the intersection of obtuse folds of the hymenium; resupinate or pileate, more or less waxy in texture. Growing on rotting wood.

This genus is a very natural one and forms a transition stage from the *Polyporaceæ* to the *Thelephoraceæ* through the genus *Phlebia* of the *Hydnaceæ*. No special study of the genus has been made and only the two common species are included here, although several others have been reported from the state.

KEY TO THE SPECIES

- Pileus always present, distinctly pinkish red when fresh 1. *M. rubellus*
 Pileus when present whitish or somewhat flesh-colored but not distinctly pinkish red 2. *M. tremellosus*

1. *M. rubellus* Peck, Bot. Gaz. 7: 44. 1882.

Pileus sessile or effused-reflexed, dimidiate, often imbricate, 3-5 x 5-7.5 x 0.2-0.5 cm., coriaceous-cartilaginous, scarcely waxy or gelatinous, deep pinkish red, often fading with age, finely tomentose, azonate, margin thin, acute; context white or light colored, tough when fresh, soft when dry, 1-4 mm. thick; tubes short, less than 1 mm. long, formed by anastomosing veins, averaging 1-2 to a mm., cream-colored or whitish; spores (teste Peck) minute, elliptical, hyaline 4-5 x 2.5-3 μ .

On dead wood of deciduous trees. Common.

This plant is distinguished from the next one by the firmer consistency and the color, although the color of the pileus often fades in mature plants. Hard (Mushrooms f. 353) gives a good illustration of the plant.

2. *M. tremellosus* Schrad. ex Fries, Syst. Myc. 1: 327. 1821.

M. tremellosus Schrad. Spic. Fl. Ger. 139. 1794.

Sessile, effused-reflexed, or entirely resupinate; pileus dimidiate, 0.5 x 3–8 x 0.1–0.3 cm., fleshy or gelatinous-waxy, white or whitish, tomentose, azonate, margin thin and acute; context whitish, soft, 1–2 mm. thick; tubes very short, formed by anastomosing ridges or veins, averaging 1–2 to a mm., whitish or somewhat flesh-colored, in resupinate forms with a wide, thin, sterile border.

On old logs in woods. Common.

Quite often the plant is entirely resupinate and probably always so in young stages. The form of the hymenium is exceptionally well shown in Atkinson, Mushrooms *f.* 191–92.

Besides the above species, *M. lacrymans* Jacq. ex Fries has been included in practically every list of fungi reported from the states east of the Mississippi River, but its frequency of occurrence is probably in inverse ratio to the number of times reported. At any rate it is to be considered as a rare fungus in this country. I have never met with specimens in Ohio that I could so refer.

IRPEX Fries, Elench. Fung. 1: 142. 1828.

Hymenium inferior, dentate-lacerate from the first. Teeth concrete with the pileus, firm, subcoriaceous, acute, reticulately disposed or arranged in rows, in sessile forms connected at the base and gill-like, or favoloid in resupinate forms. Basidia 4-spored. Woody, sessile or resupinate fungi allied to *Lenzites* and *Dædalea*. (Adapted from Fries, Hymen. Eur. 619.)

This genus is sometimes included in the *Hydnaceæ* but in at least one of the three species here described the hymenium is not toothed from the first, but is decidedly poroid and shows very close relationships to certain species of the thin pileate members of the genus *Polyporus*, e. g., *P. biformis*, *P. prolificans* etc., in which the hymenium soon becomes broken up into teeth. For this reason and because the plants are very common in our woods the three following species are described and most of the collections usually obtained will be found to answer to one of these descriptions.

KEY TO THE SPECIES

- | | |
|--|--------------------------|
| Context white or whitish..... | 1 |
| Context brown or brownish..... | 2 |
| 1. Context less than 2 mm. thick; tubes or teeth less than 5 mm. long; pileus villous..... | 1. <i>I. tulipifera</i> |
| 1. Context more than 2 mm. thick; tubes or teeth more than 5 mm. long.. | 2. <i>I. mollis</i> |
| 2. Hymenium cinnamon-brown..... | 3. <i>I. cinnamomeus</i> |
| 2. Hymenium grayish green to olivaceous..... | 4. <i>I. farinaceus</i> |

1. ***I. tulipifera*** Schw. ex Fries, Epicr. Syst. Myc. 523. 1838.

Boletus tulipifera Schw. Syn. Fung. Car. 99. 1822.

Plants sessile, effused-reflexed, or entirely resupinate; pileus dimidiate to elongate in outline, 0-1 x 1-3 x 0.1-0.6 cm., coriaceous, white or whitish, villous, zonate, margin thin and acute; context white, fibrous, 0.5-2 mm. thick; tubes 1-5 mm. long, the mouths light colored, averaging 2 to a mm., soon breaking up into compressed teeth that are connected at the base, and often with a concentric arrangement.

On dead wood of deciduous trees. Common.

From *I. cinnamomeus* Fries, and *I. farinaceus* Fries this plant is separated by the white or whitish color, and from *I. mollis* Berk. & Curt. by the much thinner pileus and the shorter tubes or teeth.

2. ***I. mollis*** Berk. & Curt. Jour. Bot. & Kew Misc. 1: 236. 1849.

Pileus sessile or effused-reflexed, dimidiate, 2-5 x 5-10 x 1-3 cm., coriaceous, white or whitish, minutely tomentose to glabrous, azonate, margin thin and acute; context white, 2-6 mm. thick, fibrous; hymenium usually irpiciform, the teeth white, coriaceous, 0.5-1.5 cm. long, compressed, united at the base.

On dead wood of deciduous trees.

This plant was reported from the Miami valley by Morgan. I have not collected it in Ohio. It is much thicker than *I. tulipifera* Schw. ex Fries, and the teeth are much longer.

3. ***I. cinnamomeus*** Fries, Epicr. Syst. Myc. 524. 1838.

Pileus none, fungus usually entirely resupinate, coriaceous in texture, 2-5 mm. thick, entirely cinnamon-brown; context brown, not more than 1 mm. thick, fibrous; tubes or teeth 1-5 mm. long, becoming toothed at a very early stage, cinnamon-brown in color, more or less flattened, connected at the base.

On dead wood, especially of species of *Acer*. Rather common.

Distinguished from the other species here listed by the uniform brown color.

4. *I. farinaceus* Fries, *Linnæa* 5: 523. 1830.

Pileus sessile, effused-reflexed, or resupinate, dimidiate, 0–0.5 x 1–3 x 0.1–0.3 cm., coriaceous, deep brown, finely tomentose, zonate, margin thin and acute; context dark brown, fibrous, less than 1 mm. thick; tubes 0.5–1.5 mm. long, mouths usually grayish green or yellowish green, averaging 2–3 to a mm., soon breaking up into teeth.

On dead wood of deciduous trees. Not common.

Sometimes the fungus is entirely resupinate and then it usually has a narrow brown margin. It is distinct from all of the other species in having a greenish hymenium.

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Names in italics are synonyms, rejected species, etc.

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